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Page 1
      1 IN THE UNITED STATES DISTRICT COURT
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                FOR THE WESTERN DISTRICT OF WISCONSIN
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      5 MENARD, INC.,
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                                     )
 7
      6
                                     )
      7 Plaintiff,
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      8
                                     ) Civil No. 3:18-CV-00844
10
     9
         vs.
11
     10
12
     11 TEXTRON AVIATION, INC.,
13
     12 DALLAS AIRMOTIVE, INC., and )
14
     13 PRATT & WHITNEY CANADA
                                     )
15
     14 INTERNATIONAL, INC.,
                                     )
16
     15
                                     )
17
     16 Defendants.
                                     )
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www.veritext.com 888-391-3376

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1 1 APPEARANCES	1 1 Exhibit No. 101 - 224
2	Photograph
2 3 On behalf of the Plaintiff:	2 2
4 Sarah K. Rathke	Exhibit No. 102 - 227
3 SQUIRE PATTON BOGGS, LLP	
5 4900 Key Tower	3 3 SAE International, Aerospace Standard
4 127 Public Square	4 Exhibit No. 103 - 228
6 Cleveland, OH 44114	4 PROTO, Statement of Accuracy
5 216.479.8154 7 sarah.rathke@squireb.com	5
6 8 Michael Q. Tidey	5 Exhibit No. 104 - 233
Corporate Counsel	6 Engineering Report
7 9 5101 Menard Drive	6 7 Exhibit No. 105 - 245
Eau Claire, WI 54703	7 Email from Ray Mariani to Aaron Jones dated
8 10	8 8 5/28/20
11	
9 On behalf of Dallas Airmotive, Inc.:	9 9 Exhibit No. 106 - 253
12	10 Protocol for the Inspection of Menards' PW530A
0 Raymond L. Mariani	11 10 Engines
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1 630 Third Avenue	13 12
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4 16	16 15
5 17 On behalf of Textron Aviation, Inc.:	
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2 (Pages 2 - 5)

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1 1 contacted you and how long did it take you to	1 1 expertise. Do you see that?
2 2 then become formally engaged?	2 2 A Yes.
3 3 A I don't recall exactly, but within a week.	3 3 Q Okay. What percentage of your let's say
4 4 Q Okay. And what charge were you given in this	4 4 within the last five years.
5 5 case? What were your directions?	5 5 What percentage of your work has been
6 6 A To investigate the cause of failure of the	6 6 relating to automotive engineering and issues?
7 7 subject diffuser bolts.	7 7 A It varies from year to year, but I would say
8 8 Q Okay. And what is it that you consider yourself	8 8 between automotive and truck, distinguishing the
9 9 to be an expert in?	9 9 two combining the two, probably 40 to
10 10 A I consider myself to be an expert in metallurgy	10 10 50 percent. It depends.
11 11 and mechanics.	11 11 Q And indeed that's the work that you do for our
12 12 (Exhibit No. 91 marked.)	12 12 firm presently; fair to say?
13 13 BY MS. RATHKE:	13 13 A I do work for your firm and other firms as well.
14 14 Q All right. And if you look at your screen	14 14 Q Okay. But for our firm it's in the automotive?
15 15 hopefully you can access Exhibit 91. Are you	15 15 A Including your firm.
16 16 able to do that?	16 16 Did you I'm sorry, did you want the
17 17 A Is that my report?	17 17 answer or the question?
18 18 Q Yes.	18 18 I think you missed that. Can we start that
19 19 A Yes. I have it open.	19 19 over?
20 20 Q Okay. Great.	20 20 (Record read.)
21 21 And I think the way that it works is you	21 21 MR. MARIANI: I just need you to answer
22 22 drive the exhibit on your screen, and I drive	22 22 that question. He didn't hear your answer, so
23 23 the exhibit on my screen, and Mr. Mariani drives	23 23 the reporter repeated the question. So can you
24 24 the exhibit on his screen. So and if you	24 24 answer what if that's correct, that you do
25	25
Page 7	Page 9
1 1 prefer to work off of a hard copy, that's fine	1 1 the firm you do the work you do for Sarah's
2 2 with me too.	2 2 firm is in automotive and trucking.
3 3 A That would be excellent. I apologize because my	3 3 THE DEPONENT: Yes, that's correct.
4 4 eyes are not as good as they used to be.	4 4 BY MS. RATHKE:
5 5 Q I know. This is there is no system that's a	5 5 Q All right. And what proportion of your work
6 6 perfect system, but this one is particularly	6 6 within the last five years involves aviation or
7 7 challenging in that it's new and it relies on	7 7 aerospace issues?
8 8 all this technology. 9 9 So if I can I think maybe start on	8 8 A Maybe 20 percent; 15 to 20. 9 9 Q And what makes up the balance of your work?
10 10 Appendix B of your expert report that sets forth	9 9 Q And what makes up the balance of your work? 10 10 A I do a lot of industrial consulting, failure
11 11 your CV. If you can join me there.	11 11 analysis-related work for industrial clients
12 12 A And I apologize. I'm having a little bit of a	12 12 that are unrelated to litigation. Typically
13 13 hard time hearing you for some reason.	13 13 that's in the area of materials failure
14 14 Q All right. Let's see.	14 14 analysis, truck and bus engineering. We also do
15 15 A I have the	15 15 a lot of insurance claims related to any number
16 16 Q I will speak louder.	16 16 of things.
17 17 A That's perfect. I'm sorry to do that to you.	17 17 Q And what percentage of your work is what you
18 18 Q No. That's quite all right. Speaking louder, I	18 18 just mentioned constitute?
19 19 can handle.	19 19 A The balance.
20 20 Okay. All right. So are you at Appendix B	20 20 Q Okay. So something on the order of 30 percent
21 21 of your expert report, which is your CV?	21 21 or so? 30 to 40?
22 22 A That is correct.	22 22 A Of the industrial-related work, yes. It's
22 22 A That is correct. 23 23 Q All right. So in the first section of your CV,	22 22 A Of the industrial-related work, yes. It's 23 23 probably 30 percent, in that range.
	·
23 23 Q All right. So in the first section of your CV,	23 23 probably 30 percent, in that range.

Page 10	Page 12
1 1 work just now, you included some consulting	Page 12  1 1 as a staff engineer in the materials department.
2 2 work, non-litigation work relating, I think, to	2 2 I worked in the materials department. Worked up
3 3 automotive. Did I understand that correctly?	3 3 through materials department, and then joined
4 4 A We do failure analysis on a variety of things.	4 4 and worked conjunctively with the mechanical and
5 5 Anything for industrial clients from steam	5 5 transportation department. And from there I was
6 6 turbines to even we even do some	6 6 promoted up I think I left Packer Engineering
7 7 aircraft-related failures as well. Basically	7 7 as a senior director of materials and
8 8 whatever comes in the door in terms of	8 8 transportation engineering.
9 9 industrial consulting that a client wants	9 9 Q And you were there for approximately, what, 14
10 10 failure analysis performed.	10 10 years? 13 years?
11 11 Q Okay. So let me ask a follow-up question that	11 11 A 12. 13. I remember left in earlier 2011.
12 12 is a little different from the question that I	12 12 Q And at Packer Engineering, were there any
13 13 first asked. So what proportion, approximately,	13 13 particular products or materials that you
14 14 of your work in the last five years has related	14 14 specialized in or focused on?
15 15 to automotive products, whether that be from	15 15 A Failure analysis, general failure analysis. We
16 16 litigation or in industrial consulting?	16 16 did a lot of automotive work. We did quite a
17 17 A I've never really that's a good question.	17 17 bit of turbine steam turbine-type work, and
18 18 I've never really tried to break it down, but I	18 18 some fire-related work as well.
19 19 would say my estimate would be, you know, 40	19 19 Q Do you do fire investigations now?
20 20 to 50 percent.	20 20 A Unfortunately, yes.
21 21 Q Okay. I'm sure I knew this at one point, but	21 21 Q And what percentage of your work does that
22 22 your CV indicates that you're a Ph.D. candidate.	22 22 consist of?
23 23 Do you plan to complete that?	23 23 A It depends from year to year. Right now, the
24 24 A I was at one time, but I don't think so anymore.	24 24 vast majority of the fire investigation work
25	25
Page 11	Page 13
Page 11 1 1 Q Okay. And what would that have been in?	Page 13 1 1 that I do is for a few companies that I've
1 1 Q Okay. And what would that have been in?	1 1 that I do is for a few companies that I've
<ul><li>1 1 Q Okay. And what would that have been in?</li><li>2 2 Materials engineering?</li></ul>	1 1 that I do is for a few companies that I've 2 2 worked for for about the last 15 years, and I do
<ul> <li>1 1 Q Okay. And what would that have been in?</li> <li>2 2 Materials engineering?</li> <li>3 3 A It would have been another hydrid materials</li> </ul>	1 1 that I do is for a few companies that I've 2 2 worked for for about the last 15 years, and I do 3 3 that mostly on an industrial consulting basis.
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1 1 Engineering.	1 1 BY MS. RATHKE:
2 2 Q And what did you do there?	2 2 Q Any classes specialized to aircraft or aviation
3 3 A The same work that I've been doing. If your	3 3 issues?
4 4 question was related to aviation-related work, I	4 4 MR. MARIANI: Objection.
5 5 began doing aviation-related work in when I	5 5 THE DEPONENT: I would consider all of my
6 6 started at ITC, and that continued at Caulfield	6 6 engineering and mechanics courses related to
7 7 Engineering.	7 7 aircraft, as well as all the failure analysis
8 8 Q And what were the circumstances in which you	8 8 courses and other things I've taken over the
9 9 first encountered, you know, your first aviation	9 9 years
10 10 project or investigation?	10 10 BY MS. RATHKE:
11 11 A I can't probably one of my first	11 11 Q Have you had any classes
12 12 investigations was with Steve Meyers actually.	12 12 A and professional development.
13 13 Q Tell me about that.	13 13 Q Have you had any classes or trainings that are
14 14 A I don't remember which one it would've been.	14 14 specific to aviation?
15 15 There was a couple failure analyses, small	15 15 MR. MARIANI: Objection to the form.
16 16 failure analysis that I did with Steve when he	16 16 THE DEPONENT: Not that I recall.
17 17 was at ITC Experts. Then there was a case that	17 17 BY MS. RATHKE:
18 18 I did I don't know if Steve was involved with	18 18 Q Okay. The next page of your CV starts with a
19 19 it. It was a landing gear case at ITC. I	19 19 section for "Education and Continuing
20 20 worked on that fuel system case with you and	20 20 Education."
21 21 Steve at Caulfield or at ITC. Excuse me.	21 21 A Yes.
22 22 Also, I think I mentioned the landing gear	22 22 Q Do you see that?
23 23 case, and I'm trying to remember. We're going	23 23 A Yes.
24 24 back a while now, but things of that nature back	24 24 Q Is this a complete list?
25	25
Page 15	Page 17
1 1 then. I believe the first case I had worked on	1 1 A No. It would be no. I've taken some other
2 2 with Steve was an engine case, but I could be	2 2 continuing education courses related to fire
3 3 mistaken.	3 3 investigation in the last six months.
4 4 Q And sum total in your professional career, how	4 4 Q Anything else?
5 5 many matters have you had involving aviation	5 5 A No. That's all that I can recall at the moment.
6 6 issues?	6 6 Q Okay. And on your license section, are all of
7 7 A I couldn't tell you in my career. I could tell	7 7 your first of all, is this a complete list of
8 8 you in the last few years if you wanted an	8 8 your licenses?
9 9 accurate answer.	9 9 A Yes.
10 10 Q Okay.	10 10 Q And are all of them current today?
11 11 A I could tell you last year besides this case, I	11 11 A Yes.
12 12 was involved in three others. And the year	12 12 Q Do you have a professional engineer license for
13 13 before that I think I was involved in three or	13 13 the State of Wisconsin?
14 14 four others as well.	14 14 A No.
15 15 Q Okay. And do you have any special training or	15 15 Q Next on your CV is a section for "Affiliations
16 16 education in the aviation field?	16 16 and Memberships." Do you see that?
17 17 A As it relates to?	17 17 A Yes.
18 18 Q Anything.	18 18 Q Is this a complete list, what you've set forth
19 19 MR. MARIANI: Objection to the form.	19 19 in this Exhibit 91?
20 20 Vague.	20 20 A Yes. Actually I am about to not be a member of
21 21 THE DEPONENT: I don't have an education in	21 21 the National Society of Professional Engineers
22 22 aircraft I don't have an education in	22 22 anymore.
23 23 aircraft maintenance or anything like that. I	23 23 Q And why is that?
24 24 just have my engineering background.	24 24 A Because the dues are outrageous and I really
25	25

Page 18			Page 20
1 1 don't get much from it.	1	1	THE DEPONENT: I'm sure in the time of
2 2 Q Okay. Other than that, are all of the	2	2	reviewing papers, I can't think of one
3 3 affiliations and memberships set forth in	3	3	specifically, but I've been reviewing papers for
4 4 Exhibit 91, are they current?	4	4	the Journal of Failure Analysis for several
5 5 A Yes.	5	5	years. Not one comes to mind, but I'm sure
6 6 Q Have you ever held any professional memberships	6	6	there's been quite a few superalloy papers that
7 7 relating to aviation specifically?	7	7	I've looked at over the years that I'm sure were
8 8 MR. MARIANI: Objection to the form.	8	8	aviation related. I just can't think of one off
9 9 Vague.	9	9	the top of my head.
10 10 You can answer.	10 1	10	BY MS. RATHKE:
11 11 THE DEPONENT: Other than the Society of	11 1	11	Q Okay. Let's turn within Exhibit 91 to your case
12 12 Automotive Engineers, which also has an	12	12	list. Sorry. We're on publications.
13 13 aerospace division, no.	13	13	Are the list of publications,
14 14 BY MS. RATHKE:	14	14	presentations, and research papers in
15 15 Q Are you a member of the aerospace division?	15	15	Exhibit 91, are those complete and current?
16 16 A I don't believe it's separated that way.	16	16	A Those are complete. I'm in the process of
17 17 Q Are there separate meetings for the aerospace	17 1	17	completing another paper for the SAE related to
18 18 division?	18	18	the metallurgy of bus bars and their
19 19 A Truthfully, I don't know.	19	19	electrical bus bars and their performance in
20 20 Q Have you ever attended any aviation any	20 2	20	fires.
21 21 aerospace meetings?	21 2	21	Q Because I suspect we're going to get asked about
22 22 A Of the SAE?	22 2	22	this, can you please spell "bus bar"?
23 23 Q Yes.	23 2	23	A Bus bar. B-U-S B-A-R. Two words, or one word
24 24 A No, not that I recall.	24 2	24	if you like.
25	25		
Page 19			Page 21
1 1 Q The next section of your CV set forth in	1	1	Q Have you ever published or presented anything
2 2 Exhibit 91 relates to "Editorial and Peer Review	2	2	specific to aviation?
3 3 and Professional Committees."	3	3	A No, not that I can think of. And it's not on my
4 4 Do you see that?	4	4	CV, so I would assume no.
5 5 A Yes.	5	5	Q All right. Turning ahead to Appendix C within
6 6 Q Is the list set forth there in Exhibit 91, is	6	6	Exhibit 91. This is your testimony list there?
7 7 that a full and current list?	7	7	A Yes.
8 8 A Yeah. One thing I would note that, yes, there's	8	8	Q All right. And it appears that well, let me
9 9 one missing, and I would note that there's an	9	9	just ask you straight up.
10 10 error in my resume. It says associate editor.	10	10	Have you set forth a full and complete list
11 11 I'm a peer reviewer on line No. 1.	11	11	of the cases in which you've rendered deposition
12 12 Q Okay.	12	12	or trial testimony since July 17, 2013?
13 13 A I'm an editorial review board. There's a	13	13	A Yes. There's only there's a deposition
14 14 misprint when my resume was changed over.	14	14	missing on here that I completed recently.
15 15 Also, I've also recently performed peer	15	15	Q Okay. And what case is that in?
16 16 review on two or three different sections of the	16	16	A It's not on the list. It was a case for Daimler
17 17 upcoming ASM handbook series related to	17	17	Trucks.
18 18 microscopy, electron microscopy, and chemical	18		Q And is Squire Patton Boggs involved in that
19 19 analysis.	19	19	matter?
20 20 Q And have you ever conducted any peer review or	20 3	20	A No. Squire Patton Boggs does the vehicle work,
21 21 editorial activities relating to work product	21 2	21	and other firms do the truck-related work.
22 22 discussing aviation issues specifically?	22 2		
23 23 MR. MARIANI: Objection to the form.	23	23	A I'm working for Daimler Truck North America.
			A I'm working for Daimler Truck North America.  Q And do you happen to know where the case is

D 22	P 24
Page 22 1 1 pending?	Page 24  1 1 A The Motorcoach Industries case was also a bolted
2 2 A It's in the Los Angeles area.	2 2 joint case. I can't remember. I think it was
3 3 Q And which law firm is representing Daimler	3 3 related to the going back a few years. Put
4 4 Trucks?	4 4 an asterisk by that because I'm not going to
5 5 A Nelson Mullins.	5 5 commit to that's what it was. I don't remember
6 6 Q And which attorney? Do you know?	6 6 for sure.
7 7 A I think the lead attorney is still Cosgrove.	7 7 Q Okay. Anything else on the list contained in
8 8 Q And what product is it a Daimler Truck	8 8 Exhibit 91?
9 9 product?	9 9 A Deenik versus Anvil was involving a joint, but
10 10 A It's a Daimler Truck product, yes.	10 10 it was a different type of joint. It wasn't a
11 11 Q Okay. Can you identify for me within Appendix C	11 11 bolted joint. It was a mechanical compression
12 12 of Exhibit 91 which of the cases listed involves	12 12 joint.
13 13 aircraft, aviation, or aerospace issues?	13 13 I think that's it on my testimony list.
14 14 A Bahamas Air Holdings versus Messier Dowty in	14 14 Q Okay. And I trust you've had other matters in
15 15 2013.	15 15 life that involved bolted joints; fair?
16 16 Q And what was the product? Is that the landing	16 16 A Oh, yes, I've been retained by your firm to
17 17 gear?	17 17 investigate bolted joint matters.
18 18 A That was the landing gear case.	18 18 Q Okay. Have you done any other work, litigation
19 19 Q And what was your role?	19 19 or otherwise, involving the failure of a bolted
20 20 A I performed the failure analysis on the landing	20 20 joint in an aircraft application?
21 21 gear.	21 21 A I looked at some insurance related landing gear
22 22 Q And specifically on what part?	22 22 bolts on something last year. I think that's
23 23 A I honestly don't remember. It was a	23 23 all I can think of off the top of my head.
24 24 high-strength steel component in the landing	24 24 Q And in the last five years, what percentage of
25	25
Page 23	Page 25
Page 23  1 1 gear that fractured during the landing.	Page 25 1 1 your work relates to a Daimler product of
	1 1 your work relates to a Daimler product of 2 2 some of any variety?
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		Page 26			Page 28
1	1	THE DEPONENT: Not that I'm aware of.	1	1	other than the diffuser bolts and nuts?
2	2	BY MS. RATHKE:	2	2	A I don't believe so.
3	3	Q Have you ever received any specialized training	3	3	Q Do you know what the procedure is for a bolt to
4	4	as an aircraft mechanic?	4	4	become certified for aerospace use?
5	5	A As an aircraft mechanic, no.	5	5	MR. MARIANI: Objection of the form.
6	6	Q Have you ever personally operated an aircraft?	6	6	Vague.
7		A Only on video games.	7	7	THE DEPONENT: I guess I don't understand
8	8	Q Have you ever personally performed maintenance	8	8	your question. I know there's a certification
9	9	on an aircraft engine?	9		process. Are you talking about the FAA
		A Maintenance, no.		10	certification process or the manufacturer's
	11		11		certification process?
	12	repair, or inspect an aircraft engine?			BY MS. RATHKE:
		A By the FAA, no.		13	
	14			14	process. Do you know what that entails for the
		A No.	15		
					Pratt & Whitney bolts at issue in this case?
	16			16	MR. MARIANI: Objection of the form.
17		courses in aviation accident reconstruction?		17	THE DEPONENT: Are you referring to how
		A No.		18	Pratt & Whitney certifies the bolts or how they
		Q Have you ever taken any training or educational	19		would be certified to go back into service?
	20	courses in aviation failure analysis?		20	
21		MR. MARIANI: Objection to the form.		21	
	22	Vague.	1		A I'm not familiar with that process.
	23	THE DEPONENT: I have not an aviation			Q Do you consider yourself to be an aviation
	24	specific failure analysis course, no.	24	24	expert?
25			25		
		Page 27			Page 29
1	1	BY MS. RATHKE:	1	1	MR. MARIANI: Objection of the form.
2	2	Q Have you ever taken any training or educational	2	2	Vague.
3	3	courses in aviation safety?			
4	4	courses in a viation surety.	3	3	THE DEPONENT: I consider myself to be an
5		A No.	3 4	3	
	5	•	l .	4 5	THE DEPONENT: I consider myself to be an expert in failure analysis. BY MS. RATHKE:
6	5 6	A No.	4	4 5	THE DEPONENT: I consider myself to be an expert in failure analysis.
	6	A No. Q Have you ever received any training from Pratt &	4 5	4 5	THE DEPONENT: I consider myself to be an expert in failure analysis. BY MS. RATHKE:
	6	A No.  Q Have you ever received any training from Pratt & Whitney?	4 5 6 7	4 5 6	THE DEPONENT: I consider myself to be an expert in failure analysis.  BY MS. RATHKE:  Q But I take it you do not consider yourself to be
7	6 7	<ul><li>A No.</li><li>Q Have you ever received any training from Pratt &amp; Whitney?</li><li>A No.</li></ul>	4 5 6 7 8	4 5 6 7	THE DEPONENT: I consider myself to be an expert in failure analysis.  BY MS. RATHKE:  Q But I take it you do not consider yourself to be specifically an aviation expert; fair?
7 8 9	6 7 8	A No. Q Have you ever received any training from Pratt & Whitney? A No. Q Have you ever received any training from the FAA?	4 5 6 7 8 9	4 5 6 7 8	THE DEPONENT: I consider myself to be an expert in failure analysis.  BY MS. RATHKE:  Q But I take it you do not consider yourself to be specifically an aviation expert; fair?  MR. MARIANI: Objection of the form. Vague
7 8 9	6 7 8 9 10	A No. Q Have you ever received any training from Pratt & Whitney? A No. Q Have you ever received any training from the FAA?	4 5 6 7 8 9	4 5 6 7 8 9	THE DEPONENT: I consider myself to be an expert in failure analysis.  BY MS. RATHKE:  Q But I take it you do not consider yourself to be specifically an aviation expert; fair?  MR. MARIANI: Objection of the form. Vague and argumentative.
7 8 9 10 11	6 7 8 9 10 11	<ul> <li>A No.</li> <li>Q Have you ever received any training from Pratt &amp; Whitney?</li> <li>A No.</li> <li>Q Have you ever received any training from the FAA?</li> <li>A No.</li> </ul>	4 5 6 7 8 9 10	4 5 6 7 8 9	THE DEPONENT: I consider myself to be an expert in failure analysis.  BY MS. RATHKE:  Q But I take it you do not consider yourself to be specifically an aviation expert; fair?  MR. MARIANI: Objection of the form. Vague and argumentative.  THE DEPONENT: Well, I certainly wouldn't
7 8 9 10 11 12	6 7 8 9 10 11 12	A No.  Q Have you ever received any training from Pratt & Whitney?  A No.  Q Have you ever received any training from the FAA?  A No.  MR. MARIANI: Objection to the form.	4 5 6 7 8 9 10 11 12	4 5 6 7 8 9 10 11	THE DEPONENT: I consider myself to be an expert in failure analysis.  BY MS. RATHKE:  Q But I take it you do not consider yourself to be specifically an aviation expert; fair?  MR. MARIANI: Objection of the form. Vague and argumentative.  THE DEPONENT: Well, I certainly wouldn't be performing an aircraft accident
7 8 9 10 11 12	6 7 8 9 10 11 12 13	A No. Q Have you ever received any training from Pratt & Whitney? A No. Q Have you ever received any training from the FAA? A No. MR. MARIANI: Objection to the form. BY MS. RATHKE:	4 5 6 7 8 9 10 11 12 13	4 5 6 7 8 9 10 11 12	THE DEPONENT: I consider myself to be an expert in failure analysis. BY MS. RATHKE: Q But I take it you do not consider yourself to be specifically an aviation expert; fair? MR. MARIANI: Objection of the form. Vague and argumentative. THE DEPONENT: Well, I certainly wouldn't be performing an aircraft accident reconstruction or anything like that. But I'm
7 8 9 10 11 12 13 14	6 7 8 9 10 11 12 13 14	A No.  Q Have you ever received any training from Pratt & Whitney?  A No.  Q Have you ever received any training from the FAA?  A No.  MR. MARIANI: Objection to the form.  BY MS. RATHKE:  Q Have you ever personally seen a Pratt & Whitney	4 5 6 7 8 9 10 11 12 13	4 5 6 7 8 9 10 11 12 13 14	THE DEPONENT: I consider myself to be an expert in failure analysis. BY MS. RATHKE: Q But I take it you do not consider yourself to be specifically an aviation expert; fair?    MR. MARIANI: Objection of the form. Vague and argumentative.    THE DEPONENT: Well, I certainly wouldn't be performing an aircraft accident reconstruction or anything like that. But I'm more than comfortable consulting on engineering
7 8 9 10 11 12 13 14 15	6 7 8 9 10 11 12 13 14	A No.  Q Have you ever received any training from Pratt & Whitney?  A No.  Q Have you ever received any training from the FAA?  A No.  MR. MARIANI: Objection to the form.  BY MS. RATHKE:  Q Have you ever personally seen a Pratt & Whitney 530A engine?  A No.	4 5 6 7 8 9 10 11 12 13 14 15	4 5 6 7 8 9 10 11 12 13 14	THE DEPONENT: I consider myself to be an expert in failure analysis.  BY MS. RATHKE:  Q But I take it you do not consider yourself to be specifically an aviation expert; fair?  MR. MARIANI: Objection of the form. Vague and argumentative.  THE DEPONENT: Well, I certainly wouldn't be performing an aircraft accident reconstruction or anything like that. But I'm more than comfortable consulting on engineering issues on aircraft that fall within my area of expertise.
7 8 9 10 11 12 13 14 15	6 7 8 9 10 11 12 13 14 15	A No. Q Have you ever received any training from Pratt & Whitney? A No. Q Have you ever received any training from the FAA? A No. MR. MARIANI: Objection to the form. BY MS. RATHKE: Q Have you ever personally seen a Pratt & Whitney 530A engine? A No. Q Including	4 5 6 7 8 9 10 11 12 13 14 15 16	4 5 6 7 8 9 10 11 12 13 14 15	THE DEPONENT: I consider myself to be an expert in failure analysis.  BY MS. RATHKE:  Q But I take it you do not consider yourself to be specifically an aviation expert; fair?  MR. MARIANI: Objection of the form. Vague and argumentative.  THE DEPONENT: Well, I certainly wouldn't be performing an aircraft accident reconstruction or anything like that. But I'm more than comfortable consulting on engineering issues on aircraft that fall within my area of expertise.  BY MS. RATHKE:
7 8 9 10 11 12 13 14 15 16 17	6 7 8 9 10 11 12 13 14 15 16	A No. Q Have you ever received any training from Pratt & Whitney? A No. Q Have you ever received any training from the FAA? A No. MR. MARIANI: Objection to the form. BY MS. RATHKE: Q Have you ever personally seen a Pratt & Whitney 530A engine? A No. Q Including A Only components.	4 5 6 7 8 9 10 11 12 13 14 15 16 17	4 5 6 7 8 9 10 11 12 13 14 15 16	THE DEPONENT: I consider myself to be an expert in failure analysis.  BY MS. RATHKE:  Q But I take it you do not consider yourself to be specifically an aviation expert; fair?  MR. MARIANI: Objection of the form. Vague and argumentative.  THE DEPONENT: Well, I certainly wouldn't be performing an aircraft accident reconstruction or anything like that. But I'm more than comfortable consulting on engineering issues on aircraft that fall within my area of expertise.  BY MS. RATHKE:
7 8 9 10 11 12 13 14 15 16 17	6 7 8 9 10 11 12 13 14 15 16 17 18	A No.  Q Have you ever received any training from Pratt & Whitney?  A No.  Q Have you ever received any training from the FAA?  A No.  MR. MARIANI: Objection to the form.  BY MS. RATHKE:  Q Have you ever personally seen a Pratt & Whitney 530A engine?  A No.  Q Including  A Only components.  Q Including in this case?	4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	4 5 6 7 8 9 10 11 12 13 14 15 16 17	THE DEPONENT: I consider myself to be an expert in failure analysis.  BY MS. RATHKE:  Q But I take it you do not consider yourself to be specifically an aviation expert; fair?  MR. MARIANI: Objection of the form. Vague and argumentative.  THE DEPONENT: Well, I certainly wouldn't be performing an aircraft accident reconstruction or anything like that. But I'm more than comfortable consulting on engineering issues on aircraft that fall within my area of expertise.  BY MS. RATHKE:  Q Do you consider yourself to be an aircraft mechanic expert?
7 8 9 10 11 12 13 14 15 16 17 18 19	6 7 8 9 10 11 12 13 14 15 16 17 18 19	A No. Q Have you ever received any training from Pratt & Whitney? A No. Q Have you ever received any training from the FAA? A No. MR. MARIANI: Objection to the form. BY MS. RATHKE: Q Have you ever personally seen a Pratt & Whitney 530A engine? A No. Q Including A Only components.	4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	THE DEPONENT: I consider myself to be an expert in failure analysis.  BY MS. RATHKE:  Q But I take it you do not consider yourself to be specifically an aviation expert; fair?  MR. MARIANI: Objection of the form. Vague and argumentative.  THE DEPONENT: Well, I certainly wouldn't be performing an aircraft accident reconstruction or anything like that. But I'm more than comfortable consulting on engineering issues on aircraft that fall within my area of expertise.  BY MS. RATHKE:  Q Do you consider yourself to be an aircraft
7 8 9 10 11 12 13 14 15 16 17 18 19 20	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	A No. Q Have you ever received any training from Pratt & Whitney? A No. Q Have you ever received any training from the FAA? A No. MR. MARIANI: Objection to the form. BY MS. RATHKE: Q Have you ever personally seen a Pratt & Whitney 530A engine? A No. Q Including A Only components. Q Including in this case? MR. MARIANI: Objection to the form. Vague.	4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	THE DEPONENT: I consider myself to be an expert in failure analysis.  BY MS. RATHKE:  Q But I take it you do not consider yourself to be specifically an aviation expert; fair?  MR. MARIANI: Objection of the form. Vague and argumentative.  THE DEPONENT: Well, I certainly wouldn't be performing an aircraft accident reconstruction or anything like that. But I'm more than comfortable consulting on engineering issues on aircraft that fall within my area of expertise.  BY MS. RATHKE:  Q Do you consider yourself to be an aircraft mechanic expert?  MR. MARIANI: Objection of the form. Vague.
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7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	A No. Q Have you ever received any training from Pratt & Whitney? A No. Q Have you ever received any training from the FAA? A No. MR. MARIANI: Objection to the form. BY MS. RATHKE: Q Have you ever personally seen a Pratt & Whitney 530A engine? A No. Q Including A Only components. Q Including in this case? MR. MARIANI: Objection to the form. Vague. THE DEPONENT: No. BY MS. RATHKE:	4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	THE DEPONENT: I consider myself to be an expert in failure analysis.  BY MS. RATHKE:  Q But I take it you do not consider yourself to be specifically an aviation expert; fair?  MR. MARIANI: Objection of the form. Vague and argumentative.  THE DEPONENT: Well, I certainly wouldn't be performing an aircraft accident reconstruction or anything like that. But I'm more than comfortable consulting on engineering issues on aircraft that fall within my area of expertise.  BY MS. RATHKE:  Q Do you consider yourself to be an aircraft mechanic expert?  MR. MARIANI: Objection of the form.  Vague.  THE DEPONENT: Specifically I don't consider myself to be an aircraft mechanic
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	A No. Q Have you ever received any training from Pratt & Whitney? A No. Q Have you ever received any training from the FAA? A No. MR. MARIANI: Objection to the form. BY MS. RATHKE: Q Have you ever personally seen a Pratt & Whitney 530A engine? A No. Q Including A Only components. Q Including in this case? MR. MARIANI: Objection to the form. Vague. THE DEPONENT: No. BY MS. RATHKE:	4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	THE DEPONENT: I consider myself to be an expert in failure analysis.  BY MS. RATHKE:  Q But I take it you do not consider yourself to be specifically an aviation expert; fair?  MR. MARIANI: Objection of the form. Vague and argumentative.  THE DEPONENT: Well, I certainly wouldn't be performing an aircraft accident reconstruction or anything like that. But I'm more than comfortable consulting on engineering issues on aircraft that fall within my area of expertise.  BY MS. RATHKE:  Q Do you consider yourself to be an aircraft mechanic expert?  MR. MARIANI: Objection of the form.  Vague.  THE DEPONENT: Specifically I don't

		Page 30			Page 32
1	1	to maintenance of aircraft or any other piece of	1	1	section of an aviation engine, correct?
2	2	equipment.	2	2	MR. MARIANI: Objection. Asked and
3	3	BY MS. RATHKE:	3	3	answered.
4	4	Q Do you consider yourself to be an expert in	4	4	You can answer again.
5	5	aviation safety and failure analysis?	5	5	THE DEPONENT: I think that's what I just
6	6	MR. MARIANI: Objection of the form.	6	6	said.
7	7	Vague.	7	7	BY MS. RATHKE:
8	8	THE DEPONENT: I don't consider myself to	8	8	Q All right. Do you agree that the 24 broken
9	9	be an expert in aviation safety per se, but I	9	9	diffuser bolts found in Menard's three aircraft
10	10	would consider myself to be an expert in failure	10	10	engines constitutes a safety issue?
11	11	analysis of aviation components as it relates to	11	11	MR. MARIANI: Objection of the form.
12	12	my background, education, and experience.	12	12	Vague.
13	13	BY MS. RATHKE:	13	13	THE DEPONENT: I will defer that answer to
14	14	Q Do you consider yourself to be an expert in the	14	14	another expert. Based on what I've seen where
15	15	installation and torquing of aviation bolts?	15	15	they end up, it could possibly be an issue, but
16	16	MS. RATHKE: Richard, that's a word you're	16	16	that's not my area.
17	17	going to hear a lot. Torquing as in torque.	17	17	•
18	18	MR. MARIANI: Objection of the form.	18	18	Q Sitting here today, do you have any reason to
19	19	You can answer.	19	19	dispute that the 24 broken diffuser bolts found
20	20	THE DEPONENT: Yes.	20	20	in Menard's three aircraft engines constitutes a
21	21	BY MS. RATHKE:	21	21	safety issue?
22	22	Q Do you consider yourself to be an expert in	22	22	MR. MARIANI: Objection. Asked and
23	23	aircraft maintenance procedures?	23	23	answered.
24	24	MR. MARIANI: Objection of the form.	24	24	You can answer again.
25			25		
		Page 31			Page 33
1	1	Vague.	1	1	THE DEPONENT: I would defer to Mr. Cheyne.
2	2	THE DEPONENT: I'm not an A & P maintenance	2	2	BY MS. RATHKE:
3	3	person, so, no, I guess specifically I'm not an	3		
4	4		)	3	Q So the answer to my question is sitting here
5		expert in every maintenance procedure as it	4		Q So the answer to my question is sitting here today you have no reason to dispute what I just
	5	expert in every maintenance procedure as it relates to aircraft maintenance. Specific areas		4	
6	5 6		4 5	4	today you have no reason to dispute what I just
6 7	6	relates to aircraft maintenance. Specific areas	4 5	4 5	today you have no reason to dispute what I just said?
	6 7	relates to aircraft maintenance. Specific areas of topics I would consider myself an expert in.	4 5 6	4 5 6 7	today you have no reason to dispute what I just said?  MR. MARIANI: Objection. Third time.
7 8	6 7	relates to aircraft maintenance. Specific areas of topics I would consider myself an expert in. BY MS. RATHKE:	4 5 6 7	4 5 6 7 8	today you have no reason to dispute what I just said?  MR. MARIANI: Objection. Third time.  THE DEPONENT: I don't have any
7 8 9	6 7 8 9	relates to aircraft maintenance. Specific areas of topics I would consider myself an expert in. BY MS. RATHKE:  Q What is the purpose of the diffuser in an	4 5 6 7 8	4 5 6 7 8 9	today you have no reason to dispute what I just said?  MR. MARIANI: Objection. Third time.  THE DEPONENT: I don't have any MR. MARIANI: You can answer hold on.
7 8 9	6 7 8 9 10	relates to aircraft maintenance. Specific areas of topics I would consider myself an expert in. BY MS. RATHKE:  Q What is the purpose of the diffuser in an aircraft jet engine?	4 5 6 7 8 9	4 5 6 7 8 9 10	today you have no reason to dispute what I just said?  MR. MARIANI: Objection. Third time.  THE DEPONENT: I don't have any  MR. MARIANI: You can answer hold on.  You can answer for a third time.
7 8 9 10	6 7 8 9 10 11	relates to aircraft maintenance. Specific areas of topics I would consider myself an expert in. BY MS. RATHKE:  Q What is the purpose of the diffuser in an aircraft jet engine?  A The diffuser is the part of the intake system	4 5 6 7 8 9 10 11	4 5 6 7 8 9 10	today you have no reason to dispute what I just said?  MR. MARIANI: Objection. Third time.  THE DEPONENT: I don't have any  MR. MARIANI: You can answer hold on.  You can answer for a third time.  THE DEPONENT: I don't have an opinion.
7 8 9 10 11 12	6 7 8 9 10 11 12	relates to aircraft maintenance. Specific areas of topics I would consider myself an expert in. BY MS. RATHKE: Q What is the purpose of the diffuser in an aircraft jet engine? A The diffuser is the part of the intake system that distributes air into the combustion chamber	4 5 6 7 8 9 10 11	4 5 6 7 8 9 10 11 12	today you have no reason to dispute what I just said?  MR. MARIANI: Objection. Third time.  THE DEPONENT: I don't have any  MR. MARIANI: You can answer hold on.  You can answer for a third time.  THE DEPONENT: I don't have an opinion.  BY MS. RATHKE:
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Page 34  1 1 MR. MARIANI: Objection. Incomplete  1 1 the other bolts will also fail?	Page 36
2 2 hypothetical. 2 2 A No, not necessarily.	
3 3 You can answer. 3 3 Q In this application involving the c	liffuser in
4 4 THE DEPONENT: Can you repeat the question? 4 4 Menard's aircraft, do you agree that	
5 5 I apologize. I couldn't hear all of it. 5 5 increased stress on the other bolts	
6 6 BY MS. RATHKE: 6 6 increases the likelihood that the ot	her bolts
7 7 Q Yes. 7 7 will fail?	
8 8 Do you agree that if the diffuser is not 8 8 MR. MARIANI: Objection. V	ague as to which
9 9 solidly held in place by the diffuser bolts, the 9 9 engine you're talking about.	
10 10 air coming from the engine compressor could 10 10 THE DEPONENT: Could you	repeat that
11 11 extinguish the combustion flame causing loss of 11 11 question again? I'm sorry. You to	
12 12 engine power? 12 12 the end. I think it's my speaker ph	
13 13 A So under your question do you mean all the bolts 13 13 apologize.	
14 14 are disconnected? 14 14 BY MS. RATHKE:	
15 15 Q Let's start there. Yes. 15 15 Q No. That's okay. You're doing f	ine.
16 16 A I can see that as being an issue because then 16 16 Do you agree that in the diffus	
17 17 the diffuser is no longer supported. 17 17 in this case when one bolt fails the	
18 18 Q Do you agree that broken diffuser bolts that are 18 18 increased stress on the remaining	diffuser
19 19 loose in the engine compartment can damage other 19 19 bolts?	
20 20 engine components? 20 20 MR. MARIANI: That was ask	ed and answered.
21 21 MR. MARIANI: Objection. Incomplete 21 21 THE DEPONENT: Yes. I and	swered that
22 22 hypothetical. 22 22 question already.	
23 23 You can answer. 23 23 BY MS. RATHKE:	
24 24 THE DEPONENT: I don't know the answer to 24 24 Q The question that I asked previous	usly related to
25	
Page 35	Page 37
1 1 that. I don't know the answer for that. 1 1 products generically. Right now I	
	am asking
2 2 However, I can tell you based on what we've seen 2 2 specifically with regard to this pro	
2 2 However, I can tell you based on what we've seen 3 3 in the data on this particular case, it does not 3 3 let me ask again.	
	duct. So
3 3 in the data on this particular case, it does not 4 4 appear that it has damaged any other engine 5 5 components.  3 3 let me ask again. 4 4 Do you agree for this diffuser of engines, do you agree that when or	duct. So on these
3 3 in the data on this particular case, it does not 4 4 appear that it has damaged any other engine 3 3 let me ask again. 4 4 Do you agree for this diffuser of	duct. So on these ne diffuser
3 3 in the data on this particular case, it does not 4 4 appear that it has damaged any other engine 5 5 components.  3 3 let me ask again. 4 4 Do you agree for this diffuser of engines, do you agree that when on	duct. So on these ne diffuser
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3 3 in the data on this particular case, it does not 4 4 appear that it has damaged any other engine 5 5 components. 6 6 BY MS. RATHKE: 7 7 Q Are you aware that in this case, the broken 8 8 diffuser bolts that came loose and were loose in 9 9 the engine compartment did, in fact, damage the 1 3 3 let me ask again. 4 4 Do you agree for this diffuser of engines, do you agree that when or bolt fails, there's an increased stress remaining diffuser bolts? 8 8 MR. MARIANI: Objection. V	on these ne diffuser as on the
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3 3 let me ask again.  4 4 appear that it has damaged any other engine 5 5 components. 5 6 BY MS. RATHKE: 6 6 bolt fails, there's an increased stress 7 7 Q Are you aware that in this case, the broken 8 8 diffuser bolts that came loose and were loose in 9 9 the engine compartment did, in fact, damage the 10 10 compression line of one of the aircrafts? 11 11 A I believe it put some dents into it. That's 13 3 let me ask again. 4 4 Do you agree for this diffuser of engines, do you agree that when or engin	on these ne diffuser ss on the rague as to which ag of. erally speaking, if
3 3 let me ask again.  4 4 appear that it has damaged any other engine 5 5 components.  6 6 BY MS. RATHKE: 7 7 Q Are you aware that in this case, the broken 8 8 diffuser bolts that came loose and were loose in 9 9 the engine compartment did, in fact, damage the 10 10 compression line of one of the aircrafts? 11 11 A I believe it put some dents into it. That's 12 12 correct. 3 3 let me ask again. 4 4 Do you agree for this diffuser of engines, do you agree that when or	on these ne diffuser ss on the Yague as to which ng of. erally speaking, if will see an
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3 3 let me ask again.  4 4 appear that it has damaged any other engine 5 5 components. 5 6 BY MS. RATHKE: 7 7 Q Are you aware that in this case, the broken 8 8 diffuser bolts that came loose and were loose in 9 9 the engine compartment did, in fact, damage the 10 10 compression line of one of the aircrafts? 11 11 A I believe it put some dents into it. That's 11 12 correct. 13 13 Q Do you agree that when multiple bolts are used 13 3 let me ask again. 4 4 Do you agree for this diffuser of engines, do you agree that when or engines, do yo	on these ne diffuser ss on the d'ague as to which ag of. erally speaking, if will see an of the joint
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3 3 in the data on this particular case, it does not 4 4 appear that it has damaged any other engine 5 5 components. 6 6 BY MS. RATHKE: 7 7 Q Are you aware that in this case, the broken 8 8 diffuser bolts that came loose and were loose in 9 9 the engine compartment did, in fact, damage the 10 10 compression line of one of the aircrafts? 11 11 A I believe it put some dents into it. That's 11 12 correct. 11 13 Q Do you agree that when multiple bolts are used 14 to join components, that when one bolt fails, 15 there is an increased stress on the remaining 16 16 bolts? 17 17 MR. MARIANI: Objection. Incomplete 18 18 hypothetical. 18 18 the remaining fasteners will 20 20 when a fracture of a bolt occurs to the 21 21 THE DEPONENT: Well, you 21 21 THE DEPONENT: Well, you 22 THE DEPONENT: Well, you 23 13 Let me ask again. 24 4 Do you agree for this diffuser of engines, do you agree that when of bolt fails, there's an increased stress an increased stress on the remaining infrasteners will bolt fails, there's an increased stress on the remaining infrasteners will a state of the same increased stress on the remaining fasteners will be compensated for by the state of the proponents of a bolt occurs to the 20 20 MR. MARIANI: Same objection. 21 21 THE DEPONENT: Well, you	on these ne diffuser as on the likelihood diffail? diffuser as on the likelihood diffuser as on the likelihood diffuser as on the diffuser
3 3 let me ask again.  4 4 appear that it has damaged any other engine 5 5 components. 6 6 BY MS. RATHKE: 7 7 Q Are you aware that in this case, the broken 8 8 diffuser bolts that came loose and were loose in 9 9 the engine compartment did, in fact, damage the 10 10 compression line of one of the aircrafts? 11 11 A I believe it put some dents into it. That's 11 12 correct. 12 12 correct. 13 13 Q Do you agree that when multiple bolts are used 14 14 to join components, that when one bolt fails, 15 15 there is an increased stress on the remaining 16 16 bolts? 17 17 MR. MARIANI: Objection. Incomplete 18 18 hypothetical. 19 19 THE DEPONENT: I agree that load is shifted 20 20 when a fracture of a bolt occurs to the 21 21 THE DEPONENT: Well, you 22 22 BY MS. RATHKE: 21 2 Do you agrees for this diffuser of engines of this diffuser of the three engines, do you agree that when one bolts from hold fails, there's an increased stress an increased stress on the remaining diffuser bolts? 24 4 Do you agree for this diffuser of engines, do you agree that when on bolt fails, there's an increased stress on the remaining diffuser bolts? 28 8 MR. MARIANI: Objection. V 3 8 8 MR. MARIANI: Objection. V 4 4 Do you agree for this diffuser of engines, do you agree that when on bolt fails, there's an increased stress on the remaining diffuser bolts? 3 8 MR. MARIANI: Objection. V 4 9 of the three engines you're speaking to	on these ne diffuser as on the rague as to which ag of. erally speaking, if will see an of the joint he remaining ased stress on the likelihood I fail? ion. Unclear. would expect the
3 3 in the data on this particular case, it does not 4 4 appear that it has damaged any other engine 5 5 components. 6 6 BY MS. RATHKE: 7 7 Q Are you aware that in this case, the broken 8 8 diffuser bolts that came loose and were loose in 9 9 the engine compartment did, in fact, damage the 10 10 compression line of one of the aircrafts? 11 11 A I believe it put some dents into it. That's 11 12 correct. 12 12 correct. 13 13 Q Do you agree that when multiple bolts are used 14 14 to join components, that when one bolt fails, 15 15 there is an increased stress on the remaining 16 16 bolts? 17 17 MR. MARIANI: Objection. Incomplete 18 18 hypothetical. 19 19 THE DEPONENT: I agree that load is shifted 20 20 when a fracture of a bolt occurs to the 21 21 engage that the increased stress on the lid. 21 22 BY MS. RATHKE: 22 22 BY MS. RATHKE: 23 23 Q And do you agree that the increased stress on 24 4 Do you agree for this diffuser of engines, do you agree that when on engine engines, do you agree that when on engines, do you agree that this increase in load on the remaininer that will be compensated for by the fasteners. 16 16 BY MS. RATHKE: 17 17 Q And do you agree that this increases the remaining fasteners increases that those remaining fasteners will that those remaining fasteners will alternating stress to increase on the gold and that point the life.	on these me diffuser as on the diague as to which ag of. erally speaking, if will see an of the joint me remaining ased stress on the likelihood I fail? ion. Unclear. would expect the mose kelihood of
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1 1 or may not increase the likelihood of those	1	1	a safe condition to fly.
2 2 bolts failing.	2	2	Q I mean, how about six out of 22? How do you
3 3 BY MS. RATHKE:	3	3	feel about that?
4 4 Q How about if, in the instance where 10 out of	4	4	MR. MARIANI: Objection. Incomplete
5 5 the 22 diffuser bolts in one of the aircraft, if	5	5	hypothetical.
6 6 10 diffuser bolts failed, do you agree that that	6	6	THE DEPONENT: Probably the same way. If
7 7 would increase the likelihood of failure of the	7	7	it was a couple, I might consider it, but I
8 8 remaining diffuser bolts?	8	8	don't know. I don't have enough the reason
9 9 A I would expect that to be the case.	9	9	I'm changing not changing, but hesitant in my
10 10 Q So then let me ask you this: Would you want to	10	10	answer is I don't have enough information to
11 11 fly on an aircraft if you knew that 10 of its 22	11	11	examine the joint in order to give you an exact
12 12 diffuser bolts had broken?	12	12	answer as it relates to that from a safety
13 13 MR. MARIANI: Objection to the form.	13	13	factor point of view. But that being said, I
14 14 Incomplete hypothetical.	14	14	think that if you're near half of the bolts
15 15 You can answer.	15	15	fractured, that the joint is going to be fairly
16 16 THE DEPONENT: Most likely not.	16	16	heavily compromised and it's probably not a safe
17 17 BY MS. RATHKE:	17	17	condition.
18 18 Q Do you have kids?	18	18	I also would say that according to the FAA,
19 19 A I'm sorry?	19	19	I guess based on what I've read, is that if any
20 20 MR. MARIANI: He couldn't hear the	20	20	of the bolts are fractured, the aircraft would
21 21 question.	21	21	be considered out of service. So I would have
22 22 BY MS. RATHKE:	22	22	to go along with that and say it's probably, as
23 23 Q Do you have kids?	23	23	far as the FAA is concerned, it's not a safe
24 24 MR. MARIANI: I'm going to	24	24	condition.
25	25		
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1 1 THE DEPONENT: No, I don't have kids.	1	1	So at that point, I would say, no, I
2 2 MR. MARIANI: I'm going to object to asking	2	2	wouldn't let my parents on the plane.
3 3 personal questions about the witness, unless you	3		BY MS. RATHKE:
4 4 have some basis to proffer how that relates to	4	4	Q Okay. So just to speak colloquially for a
5 5 his opinions about expertise in metallurgy.	5	5	second. I mean, what happened in this case with
6 6 BY MS. RATHKE:	6	6	
7 7 Q Sure.		O	the broken diffuser bolts, one engine which had
	7		10 broken diffuser bolts I mean, this is
8 8 Would you want your parents to fly on an	7 8	7	10 broken diffuser bolts I mean, this is legitimately a big deal and a cause for concern
		7 8	10 broken diffuser bolts I mean, this is legitimately a big deal and a cause for concern for Menard's; fair to say?
8 8 Would you want your parents to fly on an 9 9 aircraft if you knew that 10 out of 22 of its 10 10 diffuser bolts had failed?	8 9 10	7 8 9 10	10 broken diffuser bolts I mean, this is legitimately a big deal and a cause for concern
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8 8 Would you want your parents to fly on an 9 9 aircraft if you knew that 10 out of 22 of its 10 10 diffuser bolts had failed? 11 11 MR. MARIANI: Objection. Incomplete 12 12 hypothetical. 13 13 BY MS. RATHKE: 14 14 Q Let me complete the hypothetical. 15 15 In this scenario, you like your parents. 16 16 MR. MARIANI: I still have my objection. 17 17 BY MS. RATHKE: 18 18 Q Ray didn't like his parents. That's okay.	8 9 10 11 12 13 14 15 16 17 18	7 8 9 10 11 12 13 14 15 16 17 18	10 broken diffuser bolts I mean, this is legitimately a big deal and a cause for concern for Menard's; fair to say?  MR. MARIANI: Objection. Vague. And also compound.  You can answer.  THE DEPONENT: I'm sorry. Your question is having broken diffuser bolts is a concern for Menard's?  BY MS. RATHKE: Q Yes. A Yes. If I was Menard's, I would be concerned
8 8 Would you want your parents to fly on an 9 9 aircraft if you knew that 10 out of 22 of its 10 10 diffuser bolts had failed? 11 11 MR. MARIANI: Objection. Incomplete 12 12 hypothetical. 13 13 BY MS. RATHKE: 14 14 Q Let me complete the hypothetical. 15 15 In this scenario, you like your parents. 16 16 MR. MARIANI: I still have my objection. 17 17 BY MS. RATHKE: 18 18 Q Ray didn't like his parents. That's okay. 19 19 You have parents getting on that plane.	8 9 10 11 12 13 14 15 16 17 18	7 8 9 10 11 12 13 14 15 16 17 18	10 broken diffuser bolts I mean, this is legitimately a big deal and a cause for concern for Menard's; fair to say?  MR. MARIANI: Objection. Vague. And also compound.  You can answer.  THE DEPONENT: I'm sorry. Your question is having broken diffuser bolts is a concern for Menard's?  BY MS. RATHKE: Q Yes. A Yes. If I was Menard's, I would be concerned about it.
8 8 Would you want your parents to fly on an 9 9 aircraft if you knew that 10 out of 22 of its 10 10 diffuser bolts had failed? 11 11 MR. MARIANI: Objection. Incomplete 12 12 hypothetical. 13 13 BY MS. RATHKE: 14 14 Q Let me complete the hypothetical. 15 15 In this scenario, you like your parents. 16 16 MR. MARIANI: I still have my objection. 17 17 BY MS. RATHKE: 18 18 Q Ray didn't like his parents. That's okay. 19 19 You have parents getting on that plane. 20 20 Nobody wants their parents getting on that	8 9 10 11 12 13 14 15 16 17 18 19 20	7 8 9 10 11 12 13 14 15 16 17 18 19 20	10 broken diffuser bolts I mean, this is legitimately a big deal and a cause for concern for Menard's; fair to say?  MR. MARIANI: Objection. Vague. And also compound.  You can answer.  THE DEPONENT: I'm sorry. Your question is having broken diffuser bolts is a concern for Menard's?  BY MS. RATHKE: Q Yes. A Yes. If I was Menard's, I would be concerned about it. Q Okay. Fair enough.
8 8 Would you want your parents to fly on an 9 9 aircraft if you knew that 10 out of 22 of its 10 10 diffuser bolts had failed? 11 11 MR. MARIANI: Objection. Incomplete 12 12 hypothetical. 13 13 BY MS. RATHKE: 14 14 Q Let me complete the hypothetical. 15 15 In this scenario, you like your parents. 16 16 MR. MARIANI: I still have my objection. 17 17 BY MS. RATHKE: 18 18 Q Ray didn't like his parents. That's okay. 19 19 You have parents getting on that plane. 20 20 Nobody wants their parents getting on that 21 21 plane; fair to say, Mr. Jones?	8 9 10 11 12 13 14 15 16 17 18 19 20 21	7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	10 broken diffuser bolts I mean, this is legitimately a big deal and a cause for concern for Menard's; fair to say?  MR. MARIANI: Objection. Vague. And also compound.  You can answer.  THE DEPONENT: I'm sorry. Your question is having broken diffuser bolts is a concern for Menard's?  BY MS. RATHKE: Q Yes. A Yes. If I was Menard's, I would be concerned about it. Q Okay. Fair enough. And if it happened to you, your interest
8 8 Would you want your parents to fly on an 9 9 aircraft if you knew that 10 out of 22 of its 10 10 diffuser bolts had failed? 11 11 MR. MARIANI: Objection. Incomplete 12 12 hypothetical. 13 13 BY MS. RATHKE: 14 14 Q Let me complete the hypothetical. 15 15 In this scenario, you like your parents. 16 16 MR. MARIANI: I still have my objection. 17 17 BY MS. RATHKE: 18 18 Q Ray didn't like his parents. That's okay. 19 19 You have parents getting on that plane. 20 20 Nobody wants their parents getting on that 21 21 plane; fair to say, Mr. Jones? 22 22 A I would think at the point where you're	8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	10 broken diffuser bolts I mean, this is legitimately a big deal and a cause for concern for Menard's; fair to say?  MR. MARIANI: Objection. Vague. And also compound.  You can answer.  THE DEPONENT: I'm sorry. Your question is having broken diffuser bolts is a concern for Menard's?  BY MS. RATHKE: Q Yes. A Yes. If I was Menard's, I would be concerned about it. Q Okay. Fair enough.  And if it happened to you, your interest would be in figuring out why that happened; fair
8 8 Would you want your parents to fly on an 9 9 aircraft if you knew that 10 out of 22 of its 10 10 diffuser bolts had failed? 11 11 MR. MARIANI: Objection. Incomplete 12 12 hypothetical. 13 13 BY MS. RATHKE: 14 14 Q Let me complete the hypothetical. 15 15 In this scenario, you like your parents. 16 16 MR. MARIANI: I still have my objection. 17 17 BY MS. RATHKE: 18 18 Q Ray didn't like his parents. That's okay. 19 19 You have parents getting on that plane. 20 20 Nobody wants their parents getting on that 21 21 plane; fair to say, Mr. Jones? 22 22 A I would think at the point where you're 23 23 nearly half the bolts if nearly half the	8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	10 broken diffuser bolts I mean, this is legitimately a big deal and a cause for concern for Menard's; fair to say?  MR. MARIANI: Objection. Vague. And also compound.  You can answer.  THE DEPONENT: I'm sorry. Your question is having broken diffuser bolts is a concern for Menard's? BY MS. RATHKE: Q Yes. A Yes. If I was Menard's, I would be concerned about it. Q Okay. Fair enough.  And if it happened to you, your interest would be in figuring out why that happened; fair to say?
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Page 42			Page 44
1 1 Q And you agree that wanting to know why that	1	1	location of the fracture or anything else?
2 2 happened is a reasonable response in these	2	2	Q No.
3 3 circumstances?	3	3	MR. MARIANI: Same objection.
4 4 MR. MARIANI: Objection. Vague.	4	4	THE DEPONENT: I agree that overtorquing
5 5 You can answer, if you understand the	5	5	the bolts to the point of cracking would result
6 6 question.	6	6	in fracture.
7 7 THE DEPONENT: Well, as an engineer and a	7	7	BY MS. RATHKE:
8 8 failure analysis analyst, any time anything	8	8	Q Do you agree that is it possible to
9 9 fractures or breaks, I'm interested in the	9		overtorque the bolts, not to the point of
10 10 reason why.	10	10	cracking during the installation process but
11 11 BY MS. RATHKE:	11	11	overtorquing them short of cracking caused the
12 12 Q Do you agree that Menard's did not do anything	12	12	bolts to fail in operation?
13 13 to cause or contribute to any of the diffuser	13	13	MR. MARIANI: Objection. I'm going to
14 14 bolt failures in this case?	14	14	object. There's two questions pending. So it's
15 15 A Based on my analysis, yes. But I would defer	15	15	not clear to me if you withdrew the first
16 16 the full answer to that question to Mr. Cheyne,	16	16	question or you're asking two at the same time.
17 17 who has done more investigation into the	17	17	MS. RATHKE: I think I asked one question.
18 18 operation side of the engines.	18	18	MR. MARIANI: Then I never heard the answer
19 19 Q Do you understand Mr. Cheyne to be saying that	19	19	to the first. So can the reporter please read
20 20 Menard's did anything to cause or contribute to	20 :	20	back the last two questions and tell me if
21 21 the failure of any of these bolts?	21	21	there's any answer to the first one.
22 22 A I haven't seen any opinions of his related to	22	22	(Record read.)
23 23 that yet pardon me. To the contrary.	23	23	MR. MARIANI: You can answer if you
24 24 Q I'm sorry. I think we got like a quadruple	24	24	understand what the pending question is.
25	25		
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1 1 negative at this point. So let me just ask a	1	1	THE DEPONENT: Could you just re-ask it
	l		
2 2 straight-on one.	2	2	again so I'm clear?
3 3 Are you aware of any opinions set forth by	2 3	3	BY MS. RATHKE:
Are you aware of any opinions set forth by  Mr. Cheyne indicating that Menard's did, in some	3 4	3	BY MS. RATHKE: Q Yes.
3 3 Are you aware of any opinions set forth by	3 4	3	BY MS. RATHKE:  Q Yes.  Do you agree that overtorquing the bolts,
Are you aware of any opinions set forth by  4 4 Mr. Cheyne indicating that Menard's did, in some  5 5 way, cause or contribute to the broken diffuser  6 6 bolts?	3 4 5	3	BY MS. RATHKE:  Q Yes.  Do you agree that overtorquing the bolts, but not to the point of cracking them during the
Are you aware of any opinions set forth by  4 4 Mr. Cheyne indicating that Menard's did, in some  5 5 way, cause or contribute to the broken diffuser  6 6 bolts?  7 7 A No.	3 4 5 6 7	3 4 5 6 7	BY MS. RATHKE:  Q Yes.  Do you agree that overtorquing the bolts, but not to the point of cracking them during the installation, doing that is capable of causing
Are you aware of any opinions set forth by  4 4 Mr. Cheyne indicating that Menard's did, in some  5 5 way, cause or contribute to the broken diffuser  6 6 bolts?  7 7 A No.  8 8 Q And I take it you've reviewed Mr. Cheyne's	3 4 5 6 7 8	3 4 5 6 7 8	BY MS. RATHKE:  Q Yes.  Do you agree that overtorquing the bolts, but not to the point of cracking them during the installation, doing that is capable of causing the bolts to fail in operation?
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	Page 46			Page 4
1 1 Q	What about 160?	1	1	during the process?
2 2 A	160 is slightly over yield. If all the bolts	2	2	MR. MARIANI: Objection.
3 3 v	vere torqued in that range, I wouldn't expect	3	3	THE DEPONENT: No. I don't agree with
4 4 t	here to be a failure.	4	4	that. I think that the best method would be to
5 5 Q	You would not or would?	5	5	apply it to their torque requirements. That's
6 6 A	Pardon me?	6	6	why they they did the analysis of the joint.
7 7	I would think that it's unlikely that	7	7	They know more about it than Menard's or DAI,
8 8 y	ou're going to see a failure if they're torqued	8	8	but based on evidence and based on literature
9 9 i	n the yield range like that.	9	9	and analysis of what we have, it suggests that
10 10 Q	My question, though: Is that capable of causing	10	10	there's quite a bit of leeway.
11 11 :	a failure?	11	11	BY MS. RATHKE:
12 12 A	I'm sorry. I thought someone was jumping in.	12	12	Q Okay. But from a practical perspective, in your
13 13	If there are no cracks in the bolts, no	13	13	expert opinion, it doesn't really matter if you
14 14	cracks initiated in the bolts, I don't believe	14	14	follow Pratt & Whitney's instructions, just so
15 15	that there would be a failure related to it.	15	15	long as you don't torque the bolt to the point
16 16 Q	In any instance?	16	16	of developing a crack. There should be no risk
17 17	MR. MARIANI: Objection. Asked and	17	17	of failure.
18 18 3	answered.	18	18	MR. MARIANI: Objection. Asked and
19 19	You can answer again.	19	19	answered.
20 20	THE DEPONENT: In any instance? I mean,	20	20	You can answer again.
21 21	you're increasing the mean stress on the bolt by	21	21	THE DEPONENT: Well, yes. Basically, yes,
22 22	doing that; however, we don't know the level of	22	22	because what we're seeing, if you overtorque a
23 23 1	the alternating stress. But based on literature	23	23	bolt, you get initiation of a crack in a
	and analysis of a bolted joint, the answer would	24	24	completely different location. And because of
25		25		
	Page 47			Page 4
1 1 b	be typically no.	1	1	that, the forces that are involved on the
2 2 BY	MS. RATHKE:	2	2	aircraft that are causing it to fracture at the
3 3 Q	Okay. So if I'm understanding your expert	3	3	threads are unrelated to that.
	ppinion correctly, it is your belief that	4	4	DALMO DATHILE
5 5 0	overtorquing bolts that overtorquing the			BY MS. RATHKE:
6 1		5	5	Q Do you agree that one of the main causes of
6 6 d	liffuser bolts in this application will not		5 6	
	liffuser bolts in this application will not rause them to fracture so long as they are not		6	Q Do you agree that one of the main causes of
7 7 c		6	6 7	Q Do you agree that one of the main causes of threaded fastener failure is incorrect
7 7 c 8 8 c	rause them to fracture so long as they are not	6 7 8	6 7	Q Do you agree that one of the main causes of threaded fastener failure is incorrect tightening?
7 7 c 8 8 c 9 9 f	rause them to fracture so long as they are not tracked during the torquing process; is that a	6 7 8 9	6 7 8	<ul><li>Q Do you agree that one of the main causes of threaded fastener failure is incorrect tightening?</li><li>A Yes, I agree with that statement. And the main</li></ul>
7 7 c 8 8 c 9 9 f 10 10	rause them to fracture so long as they are not cracked during the torquing process; is that a air statement?	6 7 8 9 10	6 7 8 9	<ul> <li>Q Do you agree that one of the main causes of threaded fastener failure is incorrect tightening?</li> <li>A Yes, I agree with that statement. And the main cause of failure is insufficient tightening, not too much tightening.</li> </ul>
7 7 c 8 8 c 9 9 f 10 10	rause them to fracture so long as they are not tracked during the torquing process; is that a fair statement?  MR. MARIANI: Objection. Misstates his	6 7 8 9 10 11	6 7 8 9 10	<ul> <li>Q Do you agree that one of the main causes of threaded fastener failure is incorrect tightening?</li> <li>A Yes, I agree with that statement. And the main cause of failure is insufficient tightening, not too much tightening.</li> </ul>
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	Page 50			Page 52
1 1	It's well established that undertorquing,	1	1	BY MS. RATHKE:
2 2	or insufficient preload, moreover, is the	2	2	Q Okay. Marked as Exhibit 92 to your deposition.
3 3	primary cause of bolted fasteners.	3	3	Are you with me so far, Mr. Jones?
4 4	If you read the literature if you read	4	4	A Yes.
5 5	the literature, you'll see that most literature	5	5	Q All right. So if you turn to I see that
6 6	wants the most preload, i.e., the most torque	6	6	there are no page numbers, but if you turn to
7 7	you can possibly get on a bolt, as close to	7	7	the second-to-last page of article text that has
8 8	yield as reasonable. Or even in many cases,	8	8	Figure 7 on it.
9 9	bolts are torqued to past yield in order to	9	9	A Figure 7.
10 10	create a more uniform joint.	10	10	Q Within Exhibit 92.
11 11	THE DEPONENT: Can we take a quick break?	11	11	A Yes. That's the micrograph showing the external
12 12	MS. RATHKE: Of course.	12	12	chrome layer?
13 13	THE DEPONENT: Okay. About five minutes.	13	13	Q Yes. I mentioned that just to orient you as to
14 14	MS. RATHKE: Yeah. Of course.	14	14	page number.
15 15	THE DEPONENT: Thank you.	15	15	Okay. Do you see a Section 4 on that page
16 16	Are you done with that question?	16	16	of Exhibit 92 headed "Discussions and
17 17	MS. RATHKE: Yeah. No. Go ahead.	17	17	Conclusions"?
18 18	THE DEPONENT: Okay. Thank you.	18	18	A Yes.
19 19	(Break.)	19	19	Q Okay. About halfway down that paragraph,
20 20	BY MS. RATHKE:	20	20	there's a sentence that starts "For each bolt
21 21	Q All right. So, Mr. Jones, I didn't have time to	21	21	material."
22 22	read your entire literature file over the break,	22	22	A About halfway down?
23 23	but let's see.	23	23	MR. MARIANI: It's close to the right
24 24	Are you familiar with an article that you	24	24	margin.
25		25		
	Page 51			Page 53
1 1	produced written by some called Investigation	1	1	THE DEPONENT: Yes, I got it.
2 2	on Nickel-Based Superalloy Steam Turbine Bolts	2	2	BY MS. RATHKE:
3 3	Fractured at High Temperatures: A Case History.	3	3	Q Okay. Let me just read what I want into the
4 4	First author is somebody named Rolla, R-O-L-L-A.	4	4	record.
5 5	A Probably the Italian paper, yes. Do you have it	5	_	
6 6		-	5	So Exhibit 92 states: "For each bolt
	handy or can I grab it?		5 6	So Exhibit 92 states: "For each bolt material, the failure rate has been determined
	handy or can I grab it?  Q Holdup. I got it for you.			material, the failure rate has been determined as the ratio between the number of fractured
	-	6 7	6 7	material, the failure rate has been determined as the ratio between the number of fractured bolts over the number of used ones, and the main
7 7	Q Holdup. I got it for you.	6 7 8	6 7	material, the failure rate has been determined as the ratio between the number of fractured
7 7 8 8	Q Holdup. I got it for you.  I'm going to mark it. Okay. I don't know if you have to refresh, but if you do, on your	6 7 8 9	6 7 8	material, the failure rate has been determined as the ratio between the number of fractured bolts over the number of used ones, and the main
7 7 8 8 9 9	Q Holdup. I got it for you.  I'm going to mark it. Okay. I don't know if you have to refresh, but if you do, on your screen, you should see the Rolla article which has been marked as Exhibit 92 to your	6 7 8 9 10 11	6 7 8 9 10 11	material, the failure rate has been determined as the ratio between the number of fractured bolts over the number of used ones, and the main fracture causes have been reported. Refractaloy 26 that's R-E-F-R-A-C-T-A-L-O-Y 26 confirms to be a good choice for
7 7 8 8 9 9 10 10	Q Holdup. I got it for you.  I'm going to mark it. Okay. I don't know if you have to refresh, but if you do, on your screen, you should see the Rolla article which has been marked as Exhibit 92 to your deposition. And tell me if you	6 7 8 9 10	6 7 8 9 10 11	material, the failure rate has been determined as the ratio between the number of fractured bolts over the number of used ones, and the main fracture causes have been reported. Refractaloy 26 that's R-E-F-R-A-C-T-A-L-O-Y 26 confirms to be a good choice for high-temperature resistance bolts since its
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7 7 8 8 9 9 10 10 11 11 12 12 13 13 14 14 15 15 16 16 17 17 18 18 19 19 20 20 21 21 22 22	Q Holdup. I got it for you.  I'm going to mark it. Okay. I don't know if you have to refresh, but if you do, on your screen, you should see the Rolla article which has been marked as Exhibit 92 to your deposition. And tell me if you  (Exhibit No. 92 marked.)  MR. MARIANI: This is Ray. It didn't come up on mine.  MS. RATHKE: I'm sorry, Mr. Mariani. What did you say?  THE DEPONENT: I'm just grabbing my hard copy.  MR. MARIANI: This is Ray. It was not on mine. I'm now trying to refresh and go back in.  Okay. Now I think it's there. Let me see.  Rolla article. Okay. I'm with you.	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	material, the failure rate has been determined as the ratio between the number of fractured bolts over the number of used ones, and the main fracture causes have been reported. Refractaloy 26 that's R-E-F-R-A-C-T-A-L-O-Y 26 confirms to be a good choice for high-temperature resistance bolts since its failure rate is only 0.03 percent. 15 fractured samples over about 50,000 bolts present in the investigation."  All right. Now it says: "The main identified cause of fracture is the incorrect tightening that produces higher strengths than the designed ones, and thus the consequent induced rupture."  Do you see that?  A Yes, I do.

Page 54			Page 56
1 1 failure rate in this instance.	1	1	answered.
2 2 Do you agree with me?	-	2	You can answer.
3 3 A Yes and no. You're looking at this and looking	3	3	THE DEPONENT: Not that I think of right
4 4 at the wrong cause of failure here. They're	4	4	now.
5 5 talking about creep failures, which are not	5	5	BY MS. RATHKE:
6 6 fatigue failures. And I would agree that	6	6	Q Okay. How much have you billed on this matter
7 7 overtorquing a bolt in a creep situation could	7	7	to date?
8 8 potentially lead to a failure. It's not the	8	8	A I don't know.
9 9 same as a fatigue situation. It's unrelated.	9	9	Q Approximately?
10 10 Q Is overtorquing a bolt capable of causing a	10	10	A I don't know. I would have to look at my
11 11 fatigue failure?	11		invoices.
12 12 MR. MARIANI: Objection of the form.	12	12	Q Did you produce invoices in your file?
13 13 Incomplete hypothetical. I think it was also			A Yes.
14 14 asked and answered already.			Q Do you issue those monthly?
15 15 You can answer.			A Yes.
16 16 THE DEPONENT: In most cases overtorquing a	16	16	Q And did you produce all the invoices that you
17 17 bolt will not result in a fatigue failure.		17	have sent to date on this matter?
18 18 BY MS. RATHKE:	18	18	A Yes.
19 19 Q The question was a little different, though.			Q What did you do to prepare for your deposition
20 20 Is overtorquing a bolt capable of causing a		20	today?
21 21 fatigue failure?	21	21	A I
22 22 MR. MARIANI: Same objection.	22	22	MR. MARIANI: Hold on. I direct the
23 23 You can answer.	23	23	witness not to answer with any of your
24 24 THE DEPONENT: In some instances, it's	24	24	
25	25		
Page 55			Page 57
1 1 possible. I don't believe it's possible in this	1	1	communications where I directed you specifically
2 2 particular joint.	2	2	to assume a certain fact as applicable to the
3 3 BY MS. RATHKE:	3	3	case. Other than that, I'm directing you not to
4 4 Q In what instances is it possible for an	4	4	disclose any communications.
5 5 overtorque to cause a fatigue failure?	5	5	You can now answer.
6 6 A In a concentrically loaded joint.	6	6	THE DEPONENT: I prepared for this by
7 7 Q And what does that mean?	7	7	reviewing my report, reviewing depositions, and
8 8 A That means a joint that does not have any	8	8	reviewing my literature file and examining my
9 9 bending or prying forces on it, essentially.	9	9	data.
10 10 Q Are there any other circumstances in which		10	BY MS. RATHKE:
11 11 overtorque is capable of causing a fatigue	11		
12 12 failure?	12	12	produced to us in preparation for your
13 13 MR. MARIANI: Objection. Incomplete	13		deposition today?
	14		A I think you've been supplied everything that
14 14 hypothetical.		15	I've reviewed, or at least a cover of the book
14 14 hypothetical. 15 15 You can answer.	15		
15 15 You can answer. 16 16 THE DEPONENT: Well, I already discussed			from what I've reviewed.
15 15 You can answer. 16 16 THE DEPONENT: Well, I already discussed 17 17 so I discussed the cracking issue as well. I	15 16 17	16 17	from what I've reviewed.  Q Did you review any new materials that you hadn't
15 15 You can answer. 16 16 THE DEPONENT: Well, I already discussed 17 17 so I discussed the cracking issue as well. I 18 18 think I talked about that one. So I would say	15 16	16 17	from what I've reviewed.  Q Did you review any new materials that you hadn't seen before you wrote your expert report marked
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15 15 You can answer. 16 16 THE DEPONENT: Well, I already discussed 17 17 so I discussed the cracking issue as well. I 18 18 think I talked about that one. So I would say 19 19 that we covered the two primary issues where 20 20 you're going to see overtorquing result in a	15 16 17 18 19 20	16 17 18 19 20 21	from what I've reviewed.  Q Did you review any new materials that you hadn't seen before you wrote your expert report marked as Exhibit 91 in preparation for your deposition?
15 15 You can answer.  16 16 THE DEPONENT: Well, I already discussed  17 17 so I discussed the cracking issue as well. I  18 18 think I talked about that one. So I would say  19 19 that we covered the two primary issues where  20 20 you're going to see overtorquing result in a  21 21 crack or a fatigue failure.	15 16 17 18 19 20 21	16 17 18 19 20 21 22	from what I've reviewed.  Q Did you review any new materials that you hadn't seen before you wrote your expert report marked as Exhibit 91 in preparation for your deposition?  A Yeah, I did, actually. I think Mr. Mariani
15 15 You can answer. 16 16 THE DEPONENT: Well, I already discussed 17 17 so I discussed the cracking issue as well. I 18 18 think I talked about that one. So I would say 19 19 that we covered the two primary issues where 20 20 you're going to see overtorquing result in a 21 21 crack or a fatigue failure. 22 22 BY MS. RATHKE:	15 16 17 18 19 20 21 22	16 17 18 19 20 21 22 23	from what I've reviewed.  Q Did you review any new materials that you hadn't seen before you wrote your expert report marked as Exhibit 91 in preparation for your deposition?  A Yeah, I did, actually. I think Mr. Mariani produced it to you. There was an NTSB article

15 (Pages 54 - 57)

		Page 58			Page 60
1 1	1	Q Anything else?	1	1	Would you agree with that?
2 2	2	A I would have to double-check. Can you give me	2	2	MR. MARIANI: Objection of the form.
3 3	3	one moment?	3	3	You can answer.
4 4	4	Q Yes.	4	4	THE DEPONENT: Yes. I do believe there was
5 5	5	A Yes. There was one other article. Actually, it	5	5	a mechanic in the room on one of my phone calls,
6 6	6	was previously produced by Mr. Meyers. Another	6	6	but I don't recall that person's name.
7 7	7	article from the bolt science website.	7	7	BY MS. RATHKE:
8 8	8	Actually, I didn't review it previously, but it	8	8	Q Okay. Have you ever spoken to anybody at Dallas
9 9	9	wasn't part of my file.	9	9	Airmotive who actually engages in the process of
10 10	0	Q And did any of the new materials that you	10	10	overhauling Pratt & Whitney 530A engines?
11 1	1	reviewed that you just described to me, did any	11	11	MR. MARIANI: Objection of the form.
12 12	2	of those have significance with regard to the	12	12	You can answer.
13 13	3	expert opinion that you've rendered in this	13	13	THE DEPONENT: John Fallor is directly
14 14	4	case?	14	14	involved with PW530A.
15 13	5	MR. MARIANI: Objection to the form.	15	15	BY MS. RATHKE:
16 16		You can answer.			Q Well, in no occasion does John Fallor's stamp
17 1		THE DEPONENT: The NTSB article supports my		17	appear on any overhaul document as him having
18 18		opinion that the vast majority of bolt		18	ever completed an overhaul operation; fair to
19 19		fatigue bolt fractures are related to	19	19	say?
20 20		undertorque or improper preload. The other		20	MR. MARIANI: Objection. Argumentative.
21 2		thing that I provided just was related to	21		THE DEPONENT: I don't recall seeing his
22 22		breakaway torques and things of that nature.	22		name on any stamps.
23 23		But, no, everything confirmed my opinions.		23	
24 24				24	
25		***	25		<b>2</b>
		Page 59			Page 61
1 1	1	BY MS. RATHKE:	1	1	of Mr. Fallor's role and responsibility at
2 2	2	Q And you mentioned measurements and photographs.	2	2	Dallas Airmotives that he would be personally
3 3	3	What were those?	3	3	doing the overhaul work for Pratt & Whitney 530A
4 4	4	A The bolt testing that I performed, as well as	4	4	engines; fair to say?
5 5	5	the failure of the SEM work and optical work	5	5	MR. MARIANI: Objection to the form.
6 6	6	performed by ESI and Fusion.			
7 7			6	6	Vague.
_	7	Q Okay. And how long did you spend preparing for	6 7	6 7	
8 8		Q Okay. And how long did you spend preparing for your deposition?	7		
8 8	8		7	7 8	THE DEPONENT: I don't know what Mr. Fallor
	8 9	your deposition?	7 8 9	7 8 9	THE DEPONENT: I don't know what Mr. Fallor does. BY MS. RATHKE:
9 9	8 9 10	your deposition?  A I don't know. Maybe 12 hours. There's a lot of material.	7 8 9	7 8 9 10	THE DEPONENT: I don't know what Mr. Fallor does. BY MS. RATHKE:
9 9	8 9 10 11	your deposition?  A I don't know. Maybe 12 hours. There's a lot of material.	7 8 9 10 11	7 8 9 10	THE DEPONENT: I don't know what Mr. Fallor does.  BY MS. RATHKE:  Q Have you talked to any Dallas Airmotive employee
9 9 10 1 11 1 12 1	8 9 10 11	your deposition?  A I don't know. Maybe 12 hours. There's a lot of material.  Q Did you talk to any Dallas Airmotive mechanics	7 8 9 10 11 12	7 8 9 10 11	THE DEPONENT: I don't know what Mr. Fallor does.  BY MS. RATHKE:  Q Have you talked to any Dallas Airmotive employed about their process for overhauling 530A engines
9 9 10 1 11 1 12 1	8 9 10 11 12	your deposition?  A I don't know. Maybe 12 hours. There's a lot of material.  Q Did you talk to any Dallas Airmotive mechanics about their training?  A No, I don't believe so. I may have.	7 8 9 10 11 12 13	7 8 9 10 11 12 13	THE DEPONENT: I don't know what Mr. Fallor does.  BY MS. RATHKE:  Q Have you talked to any Dallas Airmotive employed about their process for overhauling 530A engines and specifically for overhauling the parts
9 9 10 1 11 1 12 1 13 1 14 1	8 9 10 11 12 13	your deposition?  A I don't know. Maybe 12 hours. There's a lot of material.  Q Did you talk to any Dallas Airmotive mechanics about their training?  A No, I don't believe so. I may have.	7 8 9 10 11 12 13 14	7 8 9 10 11 12 13	THE DEPONENT: I don't know what Mr. Fallor does.  BY MS. RATHKE:  Q Have you talked to any Dallas Airmotive employed about their process for overhauling 530A engines and specifically for overhauling the parts related to and adjacent to the diffuser?
9 9 10 1 11 1 12 1 13 1 14 1	8 9 10 11 12 13 14	your deposition?  A I don't know. Maybe 12 hours. There's a lot of material.  Q Did you talk to any Dallas Airmotive mechanics about their training?  A No, I don't believe so. I may have.  Q Sorry.	7 8 9 10 11 12 13 14 15	7 8 9 10 11 12 13 14	THE DEPONENT: I don't know what Mr. Fallor does.  BY MS. RATHKE:  Q Have you talked to any Dallas Airmotive employed about their process for overhauling 530A engines and specifically for overhauling the parts related to and adjacent to the diffuser?  A I've spoken to them related to parts outside of
9 9 10 1 11 1 12 1 13 1 14 1 15 1	8 9 10 11 12 13 14 15	your deposition?  A I don't know. Maybe 12 hours. There's a lot of material.  Q Did you talk to any Dallas Airmotive mechanics about their training?  A No, I don't believe so. I may have.  Q Sorry.  A No. I apologize. I'm doing it to you.	7 8 9 10 11 12 13 14 15 16	7 8 9 10 11 12 13 14 15 16	THE DEPONENT: I don't know what Mr. Fallor does.  BY MS. RATHKE:  Q Have you talked to any Dallas Airmotive employed about their process for overhauling 530A engines and specifically for overhauling the parts related to and adjacent to the diffuser?  A I've spoken to them related to parts outside of the diffuser. Is that the short form of your
9 9 10 1 11 1 12 1 13 1 14 1 15 1 16 1	8 9 10 11 12 13 14 15 16	your deposition?  A I don't know. Maybe 12 hours. There's a lot of material.  Q Did you talk to any Dallas Airmotive mechanics about their training?  A No, I don't believe so. I may have.  Q Sorry.  A No. I apologize. I'm doing it to you.  I may have. There may have been one on the call that I was on, but I don't recall.	7 8 9 10 11 12 13 14 15 16 17	7 8 9 10 11 12 13 14 15 16	THE DEPONENT: I don't know what Mr. Fallor does.  BY MS. RATHKE:  Q Have you talked to any Dallas Airmotive employed about their process for overhauling 530A engines and specifically for overhauling the parts related to and adjacent to the diffuser?  A I've spoken to them related to parts outside of the diffuser. Is that the short form of your question?
9 9 10 1 11 1 12 1 13 1 14 1 15 1 16 1 17 1	8 9 10 11 12 13 14 15 16 17	your deposition?  A I don't know. Maybe 12 hours. There's a lot of material.  Q Did you talk to any Dallas Airmotive mechanics about their training?  A No, I don't believe so. I may have.  Q Sorry.  A No. I apologize. I'm doing it to you.  I may have. There may have been one on the call that I was on, but I don't recall.	7 8 9 10 11 12 13 14 15 16 17 18	7 8 9 10 11 12 13 14 15 16 17	THE DEPONENT: I don't know what Mr. Fallor does.  BY MS. RATHKE:  Q Have you talked to any Dallas Airmotive employed about their process for overhauling 530A engines and specifically for overhauling the parts related to and adjacent to the diffuser?  A I've spoken to them related to parts outside of the diffuser. Is that the short form of your question?  Q No. The process of overhauling the diffuser and the diffuser bolts.
9 9 10 1 11 1 12 1 13 1 14 1 15 1 16 1 17 1 18 1	8 9 10 11 12 13 14 15 16 17	your deposition?  A I don't know. Maybe 12 hours. There's a lot of material.  Q Did you talk to any Dallas Airmotive mechanics about their training?  A No, I don't believe so. I may have.  Q Sorry.  A No. I apologize. I'm doing it to you.  I may have. There may have been one on the call that I was on, but I don't recall.  Q Okay. Tell me all of the Dallas Airmotive employees that you can recall speaking with.	7 8 9 10 11 12 13 14 15 16 17 18	7 8 9 10 11 12 13 14 15 16 17 18 19	THE DEPONENT: I don't know what Mr. Fallor does.  BY MS. RATHKE:  Q Have you talked to any Dallas Airmotive employed about their process for overhauling 530A engines and specifically for overhauling the parts related to and adjacent to the diffuser?  A I've spoken to them related to parts outside of the diffuser. Is that the short form of your question?  Q No. The process of overhauling the diffuser and the diffuser bolts.
9 9 9 10 1 11 1 12 1 13 1 14 1 15 1 16 1 17 1 18 1 19 1 20 2	8 9 10 11 12 13 14 15 16 17 18	your deposition?  A I don't know. Maybe 12 hours. There's a lot of material.  Q Did you talk to any Dallas Airmotive mechanics about their training?  A No, I don't believe so. I may have.  Q Sorry.  A No. I apologize. I'm doing it to you.  I may have. There may have been one on the call that I was on, but I don't recall.  Q Okay. Tell me all of the Dallas Airmotive employees that you can recall speaking with.	7 8 9 10 11 12 13 14 15 16 17 18 19 20	7 8 9 10 11 12 13 14 15 16 17 18 19	THE DEPONENT: I don't know what Mr. Fallor does.  BY MS. RATHKE:  Q Have you talked to any Dallas Airmotive employed about their process for overhauling 530A engines and specifically for overhauling the parts related to and adjacent to the diffuser?  A I've spoken to them related to parts outside of the diffuser. Is that the short form of your question?  Q No. The process of overhauling the diffuser and the diffuser bolts.  A I've spoken to them generally about it, both Mr. Cheyne and Mr. Fallor.
9 9 9 10 1 11 11 12 1 13 1 14 1 15 1 16 1 17 1 18 1 19 1 20 2 2 2 2 2 2 2	8 9 10 11 12 13 14 15 16 17 18 19 20 21	your deposition?  A I don't know. Maybe 12 hours. There's a lot of material.  Q Did you talk to any Dallas Airmotive mechanics about their training?  A No, I don't believe so. I may have.  Q Sorry.  A No. I apologize. I'm doing it to you.  I may have. There may have been one on the call that I was on, but I don't recall.  Q Okay. Tell me all of the Dallas Airmotive employees that you can recall speaking with.  A I spoke to Ian Cheyne, John Fallor, and I think I spoke to the general counsel once.	7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	THE DEPONENT: I don't know what Mr. Fallor does.  BY MS. RATHKE:  Q Have you talked to any Dallas Airmotive employed about their process for overhauling 530A engines and specifically for overhauling the parts related to and adjacent to the diffuser?  A I've spoken to them related to parts outside of the diffuser. Is that the short form of your question?  Q No. The process of overhauling the diffuser and the diffuser bolts.  A I've spoken to them generally about it, both Mr. Cheyne and Mr. Fallor.
9 9 9 10 1 11 11 12 1 13 1 14 1 15 1 16 1 17 1 18 1 19 1 20 2 2 2 2 2 2 2	8 9 10 11 12 13 14 15 16 17 18 19 20 21	your deposition?  A I don't know. Maybe 12 hours. There's a lot of material.  Q Did you talk to any Dallas Airmotive mechanics about their training?  A No, I don't believe so. I may have.  Q Sorry.  A No. I apologize. I'm doing it to you.  I may have. There may have been one on the call that I was on, but I don't recall.  Q Okay. Tell me all of the Dallas Airmotive employees that you can recall speaking with.  A I spoke to Ian Cheyne, John Fallor, and I think I spoke to the general counsel once.	7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	THE DEPONENT: I don't know what Mr. Fallor does.  BY MS. RATHKE:  Q Have you talked to any Dallas Airmotive employed about their process for overhauling 530A engines and specifically for overhauling the parts related to and adjacent to the diffuser?  A I've spoken to them related to parts outside of the diffuser. Is that the short form of your question?  Q No. The process of overhauling the diffuser and the diffuser bolts.  A I've spoken to them generally about it, both Mr. Cheyne and Mr. Fallor.  Q And what did they tell you?
9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	your deposition?  A I don't know. Maybe 12 hours. There's a lot of material.  Q Did you talk to any Dallas Airmotive mechanics about their training?  A No, I don't believe so. I may have.  Q Sorry.  A No. I apologize. I'm doing it to you.  I may have. There may have been one on the call that I was on, but I don't recall.  Q Okay. Tell me all of the Dallas Airmotive employees that you can recall speaking with.  A I spoke to Ian Cheyne, John Fallor, and I think I spoke to the general counsel once.  Q Okay. I would characterize the people that	7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	THE DEPONENT: I don't know what Mr. Fallor does.  BY MS. RATHKE:  Q Have you talked to any Dallas Airmotive employed about their process for overhauling 530A engines and specifically for overhauling the parts related to and adjacent to the diffuser?  A I've spoken to them related to parts outside of the diffuser. Is that the short form of your question?  Q No. The process of overhauling the diffuser and the diffuser bolts.  A I've spoken to them generally about it, both Mr. Cheyne and Mr. Fallor.  Q And what did they tell you?  A They confirmed the general procedure, what parts

F	Page 62		Page 64
1 1 Q And what else have you spoken with Dallas	_	1 1	connection with the overhaul the final
2 2 Airmotive employees about?		2 2	assembly installation procedures in heating;
3 3 A I can't remember if I spoke to them or I		3 3	fair to say?
4 4 communicated it through Mr. Mariani, my requ	uest 4	4 4	A I did indicate that, that's correct.
5 5 for bolts, exemplar bolts.		5 5	MR. MARIANI: Objection to form.
6 6 Q Is that where you got your exemplar bolts?	(	6 6	BY MS. RATHKE:
7 7 A Exemplar bolts from used engines were provi	ded ′	7 7	Q But not with regard to the comparison between
8 8 to me by Dallas Airmotive, and Dallas Airmoti	ive	8 8	the 530A and the 545; fair to say? That's not
9 9 also provided me 13 new bolts.	9	9 9	in the report?
10 10 Q What else? Is there anything else that you	10	0 10	MR. MARIANI: I'm just going to direct the
11 11 spoke with Dallas Airmotive employees about	t? 1	1 11	witness, you have an 80- or 90-page report, and
12 12 A One thing that I recall is discussing the desig	n 12	2 12	you can take all the time you wish right now to
13 13 of the 530A diffuser as it compares to the 540	13	3 13	review the report in order to answer that
14 14 and 545 engine.	14	4 14	question.
15 15 Q Okay. What did you learn from that discussi	on? 1:	5 15	THE DEPONENT: I'm doing that right now.
16 16 A Well, significantly to me, and significantly to	)   10	6 16	BY MS. RATHKE:
17 17 the fatigue issue is that the diffusers from the	1'	7 17	Q Sure. Although, I mean, I think we both read it
18 18 other engine are made out of a different	I	8 18	recently.
19 19 material, which has a higher Young's modulus	I		A Yep. I did mention it in my report, on page 49
20 20 which will affect the joint stiffness. And the		0 20	3
21 21 subject diffusers, the 530A diffusers, are made	e 2	1 21	January January Land
22 22 from titanium, which has half of the Young's	22	2 22	
23 23 modulus or half of the inherent material		3 23	
24 24 stiffness of the steel-type diffuser of housings			A 49 of the PDF. Page 48 of my report, 49 of the
25	2:	5	
	Page 63		Page 65
1 1 that are used on the 540 and 545 engines.		1 1	PDF, first full paragraph. Fusion Engineering
2 2 And as that's important to me is because		2 2	notes that special instruction only applies, in
3 3 that tells me right off the bat, because the 4 4 geometry of those joints are relatively the		3 3 4 4	the middle of the paragraph.
		4 4 5 5	"These engines reportedly utilize diffuser housings manufactured from a steel alloy. This
			is significant because the modulus of elasticity
6 6 hundred-thousandths of an inch of each other, 7 7 that the PW530A joint stiffness is going to be		6 6 7 7	(E) or Young's modulus, of titanium is much
8 8 on the order of half of what you see on the		8 8	lower than iron-based alloys. In fact, it's
9 9 other engines, which makes sense why we're or		99	approximately half. Consequently, the joint
10 10 seeing failures on the 530A engine, because the	•	9 9 10	
11 11 joints are compressible and the stiffness of the	I	1 11	
12 12 joint is directly related to the Young's modulus		2 12	<del>-</del>
13 13 of the materials.		3 13	
14 14 Q Did you include discussion of this issue in yo		4 14	
15 15 expert report?		5 15	•
16 16 A No, because I just got the information finally		6 16	
17 17 the other day. I think I did actually mention			A One moment. This is one in which I wish I had
		8 18	
18 18 that the yeah, actually I did. I take that		9 19	
18 18 that the yeah, actually I did. I take that 19 19 back. I think I mentioned some of it. I may	13		
1		0 20	page 2 of the PDF.
19 19 back. I think I mentioned some of it. I may	20		
19 19 back. I think I mentioned some of it. I may 20 20 have added a little more detail to it, but I do	20	0 20	Yeah, I do think it's just easier to do
19 19 back. I think I mentioned some of it. I may 20 20 have added a little more detail to it, but I do 21 21 believe I mentioned it. Yeah, I did mention it	is 20 22	0 20 1 21	Yeah, I do think it's just easier to do this if you have two machines going at once, for
19 19 back. I think I mentioned some of it. I may 20 20 have added a little more detail to it, but I do 21 21 believe I mentioned it. Yeah, I did mention it 22 22 in my report, and Mr. Cheyne mentions it in h	is 20 22 22 23	0 20 1 21 2 22 3 23	Yeah, I do think it's just easier to do this if you have two machines going at once, for
19 19 back. I think I mentioned some of it. I may 20 20 have added a little more detail to it, but I do 21 21 believe I mentioned it. Yeah, I did mention it 22 22 in my report, and Mr. Cheyne mentions it in h 23 23 report as well.	is 20 22 22 23	0 20 1 21 2 22 3 23 4 24	Yeah, I do think it's just easier to do this if you have two machines going at once, for future reference.

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1 1 Q Yeah. Exactly.	1 Do you see tha	it?
2 2 A Okay.	2 A Yes.	
3 3 Q All right. I'm on the second-to-last paragraph,	3 Q And you indicate	e that the Dallas Airmotive
4 4 "According to."	4 operation checklis	st specifically verifies that
5 5 A Yes.	5 "the mechanic app	olied compound PWC06-009 to the
6 6 Q Okay. You say: "According to the authorized	6 threads of the 22 b	polts, torqued the bolts in a
7 7 release certificates, Dallas Airmotive followed	7 star pattern, and re	etorqued the bolts at room
8 8 Revision 30 of the 30J1113 Pratt & Whitney	8 temperature."	
9 9 Overhaul Manual, June 4, 2010, and task	9 Do you see tha	ıt?
10 10 72-09-10-220-801 of the Pratt & Whitney	10 A Yes.	
11 11 Component Inspection/Repair manual when	11 Q Okay. Now that	t operation checklist, that is not
12 12 overhauling the 2006 Cessna engines in 2011.	a document that e	exists in this case with regard
13 13 Dallas Airmotive used Revision 31 of the	to each of the eng	gines, correct?
14 14 overhaul manual again in combination with the	In other words	s, there's an operations
15 15 same task number of the component	15 checklist for the 3	544 and the 545 engines but
16 16 inspection/repair manual when overhauling the	not for the 687 er	ngine. Is that your
17 17 2003 Cessna engines in 2013."	17 understanding as	well?
18 18 Okay. Other than viewing the authorized	18 A Are we missing	I know I think we're
19 19 release certificates, did you do any other	missing one, but	I can't remember which. It
20 20 investigation to verify this specific point?	20 must be the 687,	according to my report.
21 21 A No. I defer that to Mr. Cheyne.	21 Q Yes. Okay. So	fair to say that you did not see
22 22 Q And the authorized released certificates that	22 an operation chec	cklist for the 687 engine,
23 23 you viewed, they do not specifically indicate	23 correct?	
24 24 that Dallas Airmotive complied with the Pratt &	24 A If it's in my repo	ort
25		
Page 67		Page 69
1 1 Whitney specified torque values for the diffuser	1 MR. MARIAN	II: I'm going to object to the
2 2 bolts; fair statement?	2 extent I believe th	e 687 engine, Menard has
3 A I don't think so, because they're saying they		aims with respect to that
4 4 followed the Pratt & Whitney overhaul manual,		t mistaken. One of the four
5 5 which means they followed everything in the		ithdrawn the claims.
6 6 manual.	6 MS. RATHKE	: This is wrong.
7 7 Q Okay. All right. And page 4 of the report,	7 BY MS. RATHKE:	
8 8 probably the fifth page of the PDF referring to	8 Q Okay. In fact, yo	ou notice that there are
9 9 Exhibit 91.		aul records that exist for
10 10 A Yes.		of the engines at issue in
11 11 Q You refer to the Dallas Airmotive operation	11 this case, correct	?
12 12 checklist. Do you see that, the paragraph above		NI: Objection. Vague.
13 13 the graphic?		ENT: I don't remember off the top
14 14 A At least two different are you on page 5 of		ould have to go review it all
15 15 the report? I'm sorry.	again, but for son	ne reason I think you're
16 16 Q 4 of the report, 5 of the PDF.	correct, but I don	't remember 100 percent.
17 17 No, it's not you. It's just cumbersome.	17 BY MS. RATHKE:	
18 18 A No problem.	18 Q Did you ask any	one at Dallas Airmotive about why
	there were not ma	aintenance records relating to
19 Yeah, you're looking at the page with	20	engines at issue?
19 19 Yeah, you're looking at the page with 20 20 Figure 2 on it, correct?	one of the three e	
	21 A I don't recall.	
20 20 Figure 2 on it, correct?	21 A I don't recall.	nyone from Dallas Airmotive
<ul> <li>20 20 Figure 2 on it, correct?</li> <li>21 21 Q That's right.</li> <li>22 22 A Okay. And your question was?</li> <li>23 23 Q In the paragraph above that, you refer to the</li> </ul>	21 A I don't recall. 22 Q Do you recall ar	
20 20 Figure 2 on it, correct? 21 21 Q That's right. 22 22 A Okay. And your question was?	21 A I don't recall. 22 Q Do you recall ar 23 telling you that the	nyone from Dallas Airmotive

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		Page 70			Page 72
1	1	A No.	1	1	mechanics as they do their work.
2	2	Q Do you recall anybody from Dallas Airmotive	2	2	Q And where do you read that?
3	3	offering any explanation as to where the missing	3	3	A I read it in Mr. Cheyne's report, and I believe
4	4	records were?	4	4	the same was communicated to me.
5	5	A If they did, I don't recall.	5	5	Q By whom?
6	6	Q In coming to your expert opinions in this case,	6	6	A Mr. Cheyne or Mr. Fallor.
7	7	is it helpful to have full maintenance records	7	7	MS. RATHKE: I'm going to direct your
8	8	for each of the engines and components that	8	8	attention to what's been marked as Exhibit 93 on
9	9	you're giving opinions on?	9	9	the screen.
10	10	A It's always helpful, yes.	10	10	(Exhibit No. 93 marked.)
11	11	Q Are you aware that Dallas Airmotive does have	11	11	BY MS. RATHKE:
12	12	overhaul records for the 686 engine, which is	12	12	Q And after you've had a chance to take a look,
13	13	the twin of the engine where the records are	13	13	can you verify for me that Exhibit 3 (sic) is a
14	14	missing?	14	14	final assembly checklist dated June 10, 2011,
15	15	MR. MARIANI: Objection to the form.	15	15	for one of the Menard's PW530 aircraft engines?
16	16	THE DEPONENT: I'm aware that there's	16	16	A Yes, it appears to be.
17	17	records for 686.	17		Are you referring to the first page?
18	18	BY MS. RATHKE:	18	18	Q Well, it's approximately a 20-page long
19	19	Q And do you know any explanation for why Dallas	19	19	document. So the checklist goes on at some
20	20	Airmotive would have disposed of records for one	20	20	length.
21	21	engine in an aircraft but kept records for the	21	21	A Correct.
22	22	other one?	22	22	Q That's your understanding as well?
23	23	MR. MARIANI: Read back the question,			A Yes. And I believe your question is, does this
24	24	please.	24		pertain to one of the engines?
25			25		
		Page 71			Page 73
1	1	(Record read.)	1	1	Q Yes. Do you agree with me that it pertains to
2	2	MR. MARIANI: Thank you.	1		
3	3		2	2	one of the engines, yes.
4		Objection. Calls for speculation.	3		one of the engines, yes.  A Yes. I don't know specifically without
_	4	Objection. Calls for speculation. You can answer.			
5	4 5	-	3	3	A Yes. I don't know specifically without cross-referencing the overall number, but, yes.
5 6		You can answer.	3 4 5	3	A Yes. I don't know specifically without cross-referencing the overall number, but, yes.
_		You can answer. THE DEPONENT: I don't know.	3 4 5 6	3 4 5 6	<ul><li>A Yes. I don't know specifically without cross-referencing the overall number, but, yes.</li><li>Q Okay. Where would you find the overhaul number</li></ul>
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19 (Pages 70 - 73)

		Page 74			Page 76
1	1	goes beyond the scope of the opinions proffered	1	1	A No, I don't. I mean, to me this looks pretty
2	2	by the witness in the case.	2		similar to automotive engine and diesel engines
3	3	But you can answer.	3	3	checklist that work kind of the same way. But,
4	4	THE DEPONENT: I was just going to say, you	4	4	no, I don't know the answer to your question.
5	5	would have to talk to Mr. Cheyne about that or	5	5	Q Within Exhibit 93, let's go to task No. 101.
6	6	Mr. Fallor.	6	6	In task No. 101, Dallas Airmotive mechanics
7	7	BY MS. RATHKE:	7	7	are again asked to record a torque value,
8	8	Q Well, I think you were just telling me what they	8	8	correct?
9	9	were telling you about it. So I guess that's	9	9	A Yes.
10		what I'm asking.	10	10	Q So your understanding that torque values
11	11	A I'm sorry, then, can you repeat your question?	11		categorically do not get recorded on Dallas
12				12	Airmotive's operations checklists, that is an
13			13	13	incorrect understanding; fair to say?
14				14	MR. MARIANI: Objection. Misstates his
15	15	MR. MARIANI: Objection. Goes beyond the	15	15	testimony.
16				16	You can answer.
17				17	THE DEPONENT: Yeah. That's correct.
18		You can answer.		18	What I had said was I don't see them
19				19	calling out specific torques on this checklist
20				20	but you may have misunderstood me. There's only
21		don't see torque values written on here for	21		one or two instances where torques are called
22				22	out on this entire checklist.
23				23	BY MS. RATHKE:
24			24	24	
25			25		
		Page 75			Page 77
1	1	but I don't see torque requirements for	1	1	A As far as No. 101 is concerned sorry.
	1 2	but I don't see torque requirements for anything, which would suggest to me they're all	1 2		A As far as No. 101 is concerned sorry.  MR. MARIANI: Finish your answer, please.
		but I don't see torque requirements for anything, which would suggest to me they're all on the computer monitor for them.			A As far as No. 101 is concerned sorry.  MR. MARIANI: Finish your answer, please.  THE DEPONENT: As far as 101 is concerned,
2	2	but I don't see torque requirements for anything, which would suggest to me they're all on the computer monitor for them.  BY MS. RATHKE:	2 3 4	2 3 4	A As far as No. 101 is concerned sorry.  MR. MARIANI: Finish your answer, please.  THE DEPONENT: As far as 101 is concerned, make sure the key washer did not turn during
2 3	2	but I don't see torque requirements for anything, which would suggest to me they're all on the computer monitor for them. BY MS. RATHKE: Q Well, if you turn to the Bates page is 2710	2 3	2 3 4 5	A As far as No. 101 is concerned sorry.  MR. MARIANI: Finish your answer, please.  THE DEPONENT: As far as 101 is concerned, make sure the key washer did not turn during torquing of the nut at 22 degrees.
2 3 4 5	2 3 4	but I don't see torque requirements for anything, which would suggest to me they're all on the computer monitor for them.  BY MS. RATHKE:	2 3 4	2 3 4 5	A As far as No. 101 is concerned sorry.  MR. MARIANI: Finish your answer, please.  THE DEPONENT: As far as 101 is concerned, make sure the key washer did not turn during
2 3 4 5 6 7	2 3 4 5 6 7	but I don't see torque requirements for anything, which would suggest to me they're all on the computer monitor for them.  BY MS. RATHKE:  Q Well, if you turn to the Bates page is 2710 on the bottom, but it also happens to be task 83. So if you could get there with me,	2 3 4 5 6 7	2 3 4 5 6 7	A As far as No. 101 is concerned sorry.  MR. MARIANI: Finish your answer, please.  THE DEPONENT: As far as 101 is concerned, make sure the key washer did not turn during torquing of the nut at 22 degrees.  I'd have to refer to the manual on that because I find it very odd that they're
2 3 4 5 6 7 8	2 3 4 5 6 7 8	but I don't see torque requirements for anything, which would suggest to me they're all on the computer monitor for them.  BY MS. RATHKE:  Q Well, if you turn to the Bates page is 2710 on the bottom, but it also happens to be task 83. So if you could get there with me, that would be great.	2 3 4 5 6 7 8	2 3 4 5 6 7 8	A As far as No. 101 is concerned sorry.  MR. MARIANI: Finish your answer, please.  THE DEPONENT: As far as 101 is concerned, make sure the key washer did not turn during torquing of the nut at 22 degrees.  I'd have to refer to the manual on that because I find it very odd that they're requiring the degree measurement and a torque,
2 3 4 5 6 7	2 3 4 5 6 7 8	but I don't see torque requirements for anything, which would suggest to me they're all on the computer monitor for them.  BY MS. RATHKE:  Q Well, if you turn to the Bates page is 2710 on the bottom, but it also happens to be task 83. So if you could get there with me, that would be great.  A Yes.	2 3 4 5 6 7 8 9	2 3 4 5 6 7 8 9	A As far as No. 101 is concerned sorry.  MR. MARIANI: Finish your answer, please.  THE DEPONENT: As far as 101 is concerned, make sure the key washer did not turn during torquing of the nut at 22 degrees.  I'd have to refer to the manual on that because I find it very odd that they're requiring the degree measurement and a torque, so there must be some specific specification
2 3 4 5 6 7 8 9	2 3 4 5 6 7 8 9	but I don't see torque requirements for anything, which would suggest to me they're all on the computer monitor for them.  BY MS. RATHKE:  Q Well, if you turn to the Bates page is 2710 on the bottom, but it also happens to be task 83. So if you could get there with me, that would be great.  A Yes.  Q Task 83 instructs the mechanic to record a	2 3 4 5 6 7 8 9 10	2 3 4 5 6 7 8 9	A As far as No. 101 is concerned sorry.  MR. MARIANI: Finish your answer, please.  THE DEPONENT: As far as 101 is concerned, make sure the key washer did not turn during torquing of the nut at 22 degrees.  I'd have to refer to the manual on that because I find it very odd that they're requiring the degree measurement and a torque, so there must be some specific specification that they're trying to meet for No. 101. But
2 3 4 5 6 7 8 9 10 11	2 3 4 5 6 7 8 9 10	but I don't see torque requirements for anything, which would suggest to me they're all on the computer monitor for them.  BY MS. RATHKE:  Q Well, if you turn to the Bates page is 2710 on the bottom, but it also happens to be task 83. So if you could get there with me, that would be great.  A Yes.  Q Task 83 instructs the mechanic to record a torque value; fair to say?	2 3 4 5 6 7 8 9 10 11	2 3 4 5 6 7 8 9 10 11	A As far as No. 101 is concerned sorry.  MR. MARIANI: Finish your answer, please.  THE DEPONENT: As far as 101 is concerned, make sure the key washer did not turn during torquing of the nut at 22 degrees.  I'd have to refer to the manual on that because I find it very odd that they're requiring the degree measurement and a torque, so there must be some specific specification that they're trying to meet for No. 101. But without reviewing that section of the manual, I
2 3 4 5 6 7 8 9 10 11 12	2 3 4 5 6 7 8 9 10 11 12	but I don't see torque requirements for anything, which would suggest to me they're all on the computer monitor for them.  BY MS. RATHKE:  Q Well, if you turn to the Bates page is 2710 on the bottom, but it also happens to be task 83. So if you could get there with me, that would be great.  A Yes.  Q Task 83 instructs the mechanic to record a torque value; fair to say?  A "Install torque retaining nut."	2 3 4 5 6 7 8 9 10 11 12	2 3 4 5 6 7 8 9 10 11 12	A As far as No. 101 is concerned sorry.  MR. MARIANI: Finish your answer, please.  THE DEPONENT: As far as 101 is concerned, make sure the key washer did not turn during torquing of the nut at 22 degrees.  I'd have to refer to the manual on that because I find it very odd that they're requiring the degree measurement and a torque, so there must be some specific specification that they're trying to meet for No. 101. But without reviewing that section of the manual, I couldn't answer that question more specifically
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2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	but I don't see torque requirements for anything, which would suggest to me they're all on the computer monitor for them.  BY MS. RATHKE:  Q Well, if you turn to the Bates page is 2710 on the bottom, but it also happens to be task 83. So if you could get there with me, that would be great.  A Yes.  Q Task 83 instructs the mechanic to record a torque value; fair to say?  A "Install torque retaining nut."  Yes, I do.  Q So, I mean, it's not the case that Dallas Airmotive doesn't have its mechanics record torque values on its checklist. It has mechanics record torque values sometimes; fair?  A Yes. That's a very large torque. It looks like it says 2,250. I don't know what that retaining nut is but it must be a big nut.  Q And I take it you have no information as to why, in some instances, Dallas Airmotive's checklist require the mechanics to indicate a torque value	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	A As far as No. 101 is concerned sorry.  MR. MARIANI: Finish your answer, please.  THE DEPONENT: As far as 101 is concerned, make sure the key washer did not turn during torquing of the nut at 22 degrees.  I'd have to refer to the manual on that because I find it very odd that they're requiring the degree measurement and a torque, so there must be some specific specification that they're trying to meet for No. 101. But without reviewing that section of the manual, I couldn't answer that question more specifically than that.  BY MS. RATHKE:  Q Let's go to task No. 107 within Exhibit 93.  Task 107 in Exhibit 93 asks the Dallas  Airmotive engine mechanic to verify minimum breakaway torque of 2.0 pound-inches between each shank nut and bolt.  So this is an instance where the Dallas  Airmotive's instructions are directing a specified torque value; fair to say?

20 (Pages 74 - 77)

1 1 correct. 2 2 Q Through a specified torque value, correct? 3 3 A Yes. But I don't think you understand 4 4 perhaps you do, but what they're saying is it's 5 5 a test. They're not installing anything to 6 6 2 inch-pounds; they're verifying that the 7 7 breakaway torque of each bolt is at least 2. 8 8 It's not an installation torque. 9 9 Q Does that matter? 10 10 A Yeah. 11 11 MR. MARIANI: Objection. Vague. 12 12 You can answer if you understand the 13 13 question. 14 14 THE DEPONENT: It's not the same thing. 15 15 BY MS. RATHKE: 16 16 Q But is the distinction relevant? Is it 17 17 material? 18 18 MR. MARIANI: Objection. Vague. 19 19 You can answer. 19 19 You can danswer. 19 19 You can danswer. 19 19 You can answer. 2 2 THE DEPONENT: I'm sorry. I don't 3 3 understand your question. I think it speaks for 4 4 itself. But I'm not sure I understand your 5 5 question. 6 6 BY MS. RATHKE: 7 7 Q Do you have an understanding as to why the 8 Dallas Airmotive instruction tells mechanics to 9 9 apply the compound to the threads of the bolt only and not the underside of the head of the 10 10 only and not the underside of the head of the 11 11 bolt? What's the purpose for that? 12 12 MR. MARIANI: Objection of the form. 13 13 THE DEPONENT: I'm sorry. Go ahead if you 14 14 have an objection. 15 15 MR. MARIANI: I stated it. You can go. 16 16 MR. MARIANI: I stated it. You can go. 17 17 The DEPONENT: It's noteworthy, but it 18 18 want to apply a lubricant under the head of a 19 19 bolt, mostly because it can cause loosening. 19 10 You're relying on that friction in a lot of 21 21 cases. So you typically wouldn't apply a 22 22 lubricant under the head of a bolt. 23 23 BY MS. RATHKE: 24 24 Q I mean, the truth is you don't know anything 25		Page 78			Page 80
3 3 Å Yes. But I don't think you understand - 4 4 perhaps you do, but what they're saying is it's 5 5 a test. They're not installing anything to 6 6 2 inch-pounds; they're verifying that the 7 7 breakaway torque of each bolt is at least 2. 5 5 question. The breakaway torque of each bolt is at least 2. 8 8 It's not an installation torque. 9 Q Does that matter? 9 Q Does that matter? 9 PQ Does that matter? 11 Does the bolt only and not the underside of the head of the bolt only and not the underside of the head of the bolt only and not the underside of the head of the bolt only and not the underside of the head of the bolt only and not the underside of the head of the bolt only and not the underside of the head of the bolt only and not the underside of the head of the bolt only and not the underside of the head of the bolt only and not the underside of the head of the bolt only and not the underside of the head of the bolt only and not the underside of the head of the bolt only and not the underside of the head of a bolt. 15 Does that we anything to do with the cause of failure of these bolts as far as I'm concerned. 19 PQ Does that we anything to do with the cause of failure of these bolts as far as I'm concerned. 19 PQ Does that PQ	1 1	_	1	1	
3 3   A   Yes. But I don't think you understand -   4   4   perhaps you do, but what they're saying is it's 5   5   a test. They're not installing anything to 6   2   inch-pounds; they're verifying that the 7   7   Power of the 1   1   1   1   1   1   1   1   1   1	2 2	Q Through a specified torque value, correct?	2	2	THE DEPONENT: I'm sorry. I don't
5   5   a test. They're not installing anything to 6   2 inch-pounds; they're verifying that the 7   7   Do you have an understanding as to why the 8   8   It's not an installation torque. 8   It's not an installation torque. 9   9   Q Does that matter? 9   9   Q Does that matter? 10   10   A Yeah. 11   11   MR. MARIANI: Objection. Vague. 11   11   MR. MARIANI: Objection. Vague. 13   13   question. 14   14   THE DEPONENT: It's not the same thing; 15   15   PMS, RATHKE: 15   16   Q But is the distinction relevant? Is it material? 16   16   Q But is the distinction relevant? Is it material? 17   17   17   18   18   MR. MARIANI: Objection. Vague. 19   19   You can answer. 19   19   You can answer. 19   10   Ams and the truth is you don't know anything to do with the cause of 22   22   failure of these bolts as far as I'm concerned. 23   23   BY MS. RATHKE: 24   24   Q I mean, the truth is you don't know anything 25   22   22   23   24   24   Q And you know that in operation, there is 25   25   26   27   28   29   29   29   29   29   29   29	3 3	A Yes. But I don't think you understand	3	3	understand your question. I think it speaks for
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10   10   A Yeah.   10   10   10   10   10   10   10   1	8 8	It's not an installation torque.	8	8	Dallas Airmotive instruction tells mechanics to
11 11 MR. MARIANI: Objection. Vague. 12 12 You can answer if you understand the question. 13 13 question. 14 14 THE DEPONENT: It's not the same thing. 15 15 BY MS. RATHKE: 16 16 Q But is the distinction relevant? Is it material? 17 material? 18 18 MR. MARIANI: Objection. Vague. 19 19 You can answer. 11 11 THE DEPONENT: It's noteworthy, but it dean't have anything to do with the cause of failure of these bolts as far as I'm concerned. 12 2 22 failure of these bolts as far as I'm concerned. 13 13 A Day and not others in its operations checklist; fair to answer it yet again, a fourth time. 15 18 MR. MARIANI: Objection. Asked and to the knowledge that I have as it relates to this of the workness on this point. I'll allow the witness to answer a fourth time. 15 17 THE DEPONENT: As I said, I've given you the knowledge that I have as it relates to this of the head of the bolt; fair? 16 18 MR. MARIANI: Objection. Asked and the workness on this point. I'll allow the witness to answer it yet again, a fourth time. 15 19 MR. MARIANI: Objection of the form. 17 17 The DEPONENT: The sorry. Go ahead if you have an objection. 18 18 MR. MARIANI: Objection was a far as I'm concerned. 19 19 You can answer. 20 20 The instruction to apply the compound to the	9 9	Q Does that matter?	9	9	apply the compound to the threads of the bolt
12   12   You can answer if you understand the   13   13   question.     14   14	10 10	) A Yeah.	10	10	only and not the underside of the head of the
13 13   question.   14 14   THE DEPONENT: It's not the same thing.   15 15 BY MS. RATHKE:   16 16 Q But is the distinction relevant? Is it   17 material?   17 material?   17 material?   17 material?   18 18   MR. MARIANI: Objection. Vague.   19 19   You can answer.   17 the DEPONENT: It's noteworthy, but it   18 18   22 22   22   failure of these bolts as far as I'm concerned.   23 23   BY MS. RATHKE:   24 24 Q I mean, the truth is you don't know anything   24 24 Q I mean, the truth is you don't know anything   25 25   25   25   26 2   27 2 2 2 2 2 2 2 2 3 3 3 3 4 No. Twe had cases and not others in its operations checklist; fair   24 24 Q And you know that in operation, there is   25 2 2 2 2 3 3 3 3 4 No. Twe had cases - in cases I've been   10 10   the knowledge that I have as it relates to this   11 1   document.   11 1   document.   12 12 BY MS. RATHKE:   12 BY MS. RATHKE:   13 13 Q Task No. 30 in Exhibit 93, it indicates that the   14 14 Dallas Airmotive mechanic is to apply the   15 15   compound PTWC06-009 to the threads and install   16 16   the 22 bolts.   17 17	11 11	MR. MARIANI: Objection. Vague.	11	11	bolt? What's the purpose for that?
14   14   THE DEPONENT: It's not the same thing   15   15   BY MS. RATHKE:   15   15   BY MS. RATHKE:   16   16   Q But is the distinction relevant? Is it   16   16   Q But is the distinction relevant? Is it   16   17   17   18   18   MR. MARIANI: Objection. Vague.   19   19   You can answer.   10   10   10   10   10   11   11   document.   11   11   document.   11   11   document.   11   11   Do you see that?   11   Do you see that?   11   Do you see that?   12   22   bolts, do you know what the purpose is of that instruction?   12   21   16   16   16   16   16   16	12 12	You can answer if you understand the	12	12	MR. MARIANI: Objection of the form.
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18 18 MR. MARIANI: Objection. Vague. 19 19 You can answer. 20 20 THE DEPONENT: It's noteworthy, but it doesn't have anything to do with the cause of failure of these bolts as far as I'm concerned. 22 22 failure of these bolts as far as I'm concerned. 23 23 BY MS. RATHKE: 24 24 Q I mean, the truth is you don't know anything 25  Page 79  1 1 about why Dallas Airmotive includes some tasks 2 2 and not others in its operations checklist; fair 3 3 to say?  1 1 about why Dallas Airmotive includes some tasks 2 2 and not others in its operations checklist; fair 3 3 to say?  1 1 about why Dallas Airmotive includes some tasks 2 2 and not others in its operations checklist; fair 3 3 to say?  3 3 No. I've had cases in cases I've been involved in where people put have put lubricant on places where they haven't supposed to, and they resulted in failures, or loosening failures.  8 8 You can answer a fourth time. 9 THE DEPONENT: As I said, I've given you 10 10 the knowledge that I have as it relates to this 11 document. 11 12 DBY MS. RATHKE: 12 12 BY MS. RATHKE: 13 13 Q Task No. 30 in Exhibit 93, it indicates that the Dallas Airmotive mechanic is to apply the compound PTWC06-009 to the threads and install 16 16 the 22 bolts. 17 17 Do you see that? 18 18 A Yes. 18 18 A Yes. 19 19 Q The instruction to apply the compound to the threads of the bolts, like the underside of the head of the bolts, like the underside of the head of the bolts, like the underside of the head of the bolts, like the underside of the head of the bolts, like the underside of the head of the bolts, like the underside of the head of the bolts, like the underside of the head of the bolts, like the underside of the head of the bolts, like the underside of the head of the bolts, like the underside of the head of the bolts, like the underside of the head of the bolts, like the underside of the head of the bolts, like the underside of the head of the bolts, like the underside of the head of the bolts, like the underside of the head of the bolts, like the undersi	16 16	6 Q But is the distinction relevant? Is it	16	16	THE DEPONENT: Typically you don't apply
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22 22 failure of these bolts as far as I'm concerned. 23 23 BY MS. RATHKE: 24 24 Q I mean, the truth is you don't know anything 25  Page 79 1 1 about why Dallas Airmotive includes some tasks 2 2 and not others in its operations checklist; fair 3 3 to say? 4 4 MR. MARIANI: Objection. Asked and 5 5 answered three times. You're badgering the 6 6 witness on this point. I'll allow the witness 7 7 to answer it yet again, a fourth time. 8 8 You can answer a fourth time. 9 9 THE DEPONENT: As I said, I've given you 10 10 the knowledge that I have as it relates to this 11 11 document. 12 12 BY MS. RATHKE: 13 13 Q Task No. 30 in Exhibit 93, it indicates that the 14 Dallas Airmotive mechanic is to apply the 15 15 compound PTWC06-009 to the threads and install 16 16 the 22 bolts. 17 17 Do you see that? 18 18 A Yes. 19 19 Q The instruction to apply the compound to the 20 20 threads of the bolts, like the underside of the head of a bolt. 23 23 BY MS. RATHKE: 24 24 Q And you know that in operation, there is 25 24 1 typically not lubricant applied under the head of a bolt. 23 23 BY MS. RATHKE: 24 24 Q And you know that in operation, there is 25 24 24 Q And you know that in operation, there is 25 25  Page 79  Page 8  Page 79  A No. I've had cases in cases I've been 1 involved in where people put have put lubricant 22 2 of the bolt; fair to say? 3 3 A No. I've had cases in cases I've been 4 4 involved in where people put have put lubricant 24 4 involved in where people put have put lubricant applied under the head 25 of the bolt; fair to say? 3 3 A No. I've had cases in cases I've been 4 4 involved in where people put have put lubricant applied under the head 3 A No. I've had cases in cases I've been 4 4 involved in where people put have put lubricant applied under the head 3 A No. I've had cases in cases I've been 4 4 4 involved in where people put have put lubricant applied under the head 5 5 on places where they haven't supposed to have 10 10 lubricant applied under the head 11 11 of the bolt; fair to say? 11 11	20 20	THE DEPONENT: It's noteworthy, but it	20	20	You're relying on that friction in a lot of
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					-
25		MR. MARIANI: Objection to the form.		24	have they not been?
	1 25		25		

21 (Pages 78 - 81)

	p. 92			D 04
1 1	Page 82 MR. MARIANI: Objection. Compound.	1	1	Page 84 Q Okay. The middle of that paragraph indicates:
2 2	You can answer if you understand what	2	2	"Calibration reports produced by Dallas
3 3	question is pending.	3	3	Airmotive indicate that the workstation where
4 4	THE DEPONENT: I'm sorry. I didn't catch	4	4	the diffuser was assembled at Dallas Airmotive
5 5	that last part. I caught like two words,	5	5	had torque wrenches in the ranges of 0 to
6 6	"mechanics" and that was it.	6	6	3 inch-pounds (sic), 0 to 50 inch-pounds, 0 to
7 7		7	7	75 inch-pounds, and 10 to 50 inch-pounds that
8 8		8	8	were calibrated every four months."
9 9	mechanics are applying lubricant to the	9	9	Do you see that?
10 10	** *	10	10	•
11 11	•	11		MR. MARIANI: Excuse me. I think you
12 12	A I don't have that belief. I have seen no		12	•
13 13		13	13	
14 14			14	
15 15		15	15	
16 16	diffuser bolts, does that replicate real-world	16	16	
17 17	_	17	17	•
18 18		18	18	
19 19		19	19	MR. MARIANI: Okay.
20 20	Please read back the question, Rich.	20	20	BY MS. RATHKE:
21 21		21	21	Q My question for you, Mr. Jones, is, were there
22 22	MR. MARIANI: Thank you.	22	22	any records that you saw as to which of these
23 23	You can answer.	23	23	torque wrenches was used for each part of the
24 24	THE DEPONENT: I think I already answered	24	24	final assembly operation?
25		25		
	Page 83			Page 85
1 1	the question.		1	Actually let me scratch that question and
2 2	(Record read.)		2	let me instead ask: Did you see any records as
3 3	THE DEPONENT: Okay. Well, my answer would		3	to which of these torque wrenches were used to
4 4	be that other than maybe a little bit of		4	reapply the diffuser bolts after overhaul?
5 5	transfer that may have come from the thread as	5	5	A No, I have not seen that record, but any of them
6 6	it goes through the hole, I wouldn't expect		6	would be appropriate. Moreover, 0 to 50 or 0 to
7 7	there to be a significant amount of lubricant	7	7	75 would probably be the most appropriate, or
8 8	under the head. Of course, when you lubricate		8	the 10 to 50.
9 9	the bolts and put them through the hole, you may	9	9	Q Then why are those the most appropriate?
10 10	,			A The 0 to 30 could be used. I prefer to use a
11 11		11		torque wrench when I'm doing a measurement of
12 12		12		something like that, to use something closer to
13 13		13		where my obtained value is more in the middle of
14 14		14		the range of the tool, but if the 0 to 30
15 15	-	15		calibrates out at 30 inch-pounds to
16 16		16		30 inch-pounds, it's appropriate. It can be
17 17	,	17		used.
18 18			18	
19 19	· ·	19		range of a torque wrench is, let's say, 0 to 30
20 20		20		versus 0 to 75, for instance, the less precise
21 21		21		its measurements are?
22 22				A I wouldn't say necessarily less precise.
23 23		23		Depending on the accuracy and precision of the
24 24	A I'm there.	24	<i>2</i> 4	torque wrench, it would be more important to me,
25		25		

1 1 and then the precision. But I would have to1 1 metallurgist.2 2 look at those documents to see that.2 2 Q And anybody else contribute to the la	Page 88
2 2 look at those documents to see that. 2 2 Q And anybody else contribute to the la	
	nguage set
3 3 Q Do you know what kind of torque wrenches were 3 3 forth in Exhibit 91?	
4 4 used for the replacement of diffuser bolts at 4 4 A No. Primarily it was myself and then	the
5 5 Dallas Airmotive? 5 5 remainder you know, parts in editing	g done by
6 6 A I don't recall if they were on the 6 6 those two people.	
7 7 Bates-numbered documents or not. I can't 7 7 Q Okay. Was editing done by any other	r people?
8 8 recall. I would have to refer to them. 8 8 A In terms of the report composition?	
9 9 Q Did you see any of the instrumentation that 9 9 Q Yes, please.	
10 10 Dallas Airmotive used to reapply the diffuser 10 10 A People that it's gone through internal	review,
11 11 bolts after overhaul? 11 11 but no other people wrote anything.	
12 12 A Did I personally see it? 12 12 Q Okay. So what was Ms. Schimpf's c	ontribution to
13 13 Q Yes. 13 13 Exhibit 91?	
14 14 A No. 14 14 A Nicole wrote some of the introduction	n areas, and
15 15 Q Okay. It is physically possible to tighten 15 15 she also went and probably did a fair l	
16 16 diffuser bolts using a regular ratchet wrench, 16 16 correcting my writing.	
17 17 correct? 17 17 Q Anything else?	
18 18 A Yes. 18 18 A She helped write some of the factual	parts of
19 19 Q And it is physically possible to tighten 19 19 the report.	-
20 20 diffuser bolts by hand? 20 20 Q Factual, like the beginning sections v	which we've
21 21 A You mean without a wrench? 21 21 already discussed?	
22 22 MR. MARIANI: Objection to the form. 22 22 A Yes. And also I think she put togeth	er I'm
23 23 BY MS. RATHKE: 23 23 sorry. It's been a few months, but I th	
24 24 Q It could be done. 24 24 put together kind of the summary of the	
25	υ
Page 87	Page 89
1 1 A Without a wrench? 1 1 and things like that. I don't think I wro	ote all
2 2 Q Yes. 2 2 of that.	
3 3 A No. 3 Q Did she assist with any of the testing	itself?
4 4 Q And why not? 4 4 A Yes. She was involved in the testing	
5 5 A Because if you don't have a wrench, the 5 5 Q What did Ms. Schimpf do with regard	
5 5 A Because if you don't have a wrench, the 6 6 prevailing torque of the nut is about 5 5 Q What did Ms. Schimpf do with regard 6 6 testing?	d to your
5 5 A Because if you don't have a wrench, the 6 6 prevailing torque of the nut is about 7 7 9 inch-pounds. It's kind of difficult to apply 5 5 Q What did Ms. Schimpf do with regard 6 6 testing? 7 7 A It's kind of a two-man job. So herself	d to your f or Kevin
5 5 A Because if you don't have a wrench, the 6 6 prevailing torque of the nut is about 7 7 9 inch-pounds. It's kind of difficult to apply 8 8 9 inch-pounds of torque to a No. 10 bolt by 5 5 Q What did Ms. Schimpf do with regard 6 6 testing? 7 7 A It's kind of a two-man job. So hersely 8 8 Jones would be assisting when we're p	d to your  f or Kevin  outting
5 5 A Because if you don't have a wrench, the 6 6 prevailing torque of the nut is about 7 7 9 inch-pounds. It's kind of difficult to apply 8 8 9 inch-pounds of torque to a No. 10 bolt by 9 9 hand, especially on the diffuser housing. 5 5 Q What did Ms. Schimpf do with regard 6 6 testing? 7 7 A It's kind of a two-man job. So herself 8 8 Jones would be assisting when we're p 9 9 the when we were running the testing	d to your  f or Kevin  outting  ig that
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1 1 Q And what do you mean by the NTSB research? What 2 2 2 doses that specifically refer to? 3 3 A Mr. Meyers had produced a ton of NTSB citings 4 4 Talking about bott torque, and I was interested 4 5 5 10 uses what those were beause, as I told you 6 6 previously, that the vast, overwhelming majority 7 7 of bot fatigue failures are due to insufficient 8 8 preducts So I had Nicole og through those 9 9 documents one by one and determine if any of 10 10 them were related to overtorquing. 11 11 Q And what did you determine? 12 12 A As I recall, I don't think there were any 13 13 in instances that were overlonging. There may 14 14 have been one, but I don't — Tro not stue. I 15 15 would have to look. If you like, I can consult 16 16 my data and let you know. 17 17 Q Up to you after this but not at this time. But 18 18 thank you for Offering. 18 18 thank you for Offering. 19 19 A Some of the NTSB research that was performed is 10 to the vast majority were due to undertorque or 10 to the vast majority were due to undertorque or 11 17 Q Okap, Seems to me like you can't swing a dead 22 2 1 insufficient protoad. 22 2 Q Okay, Seems to me like you can't swing a dead 23 2 cain this case without maning into the 24 24 Bickford book. Is that something that 25 2 Verification of the NTSB research flat was performed in the work was performed alf my direction. 27 Q Have you produced that summary in this case? 28 A Yes. 29 Q Did you, yourself, read Mr. Meyers' deposition. 27 Q Have you produced that summary in this case? 29 Q Did you, yourself, read Mr. Meyers' deposition. 21 Q And his deposition transcript? 21 11 A Yes. I read every word of it. 22 12 A No. I think even with his bold, Kevin ran the microscopes and things of that nature, but the work was performed at my direction. 21 17 Q Okap, Murgard and things of the naturative, but the work was performed at my direction. 22 2 10 insufficient protoad. 23 2 2 insufficient protoad. 24 2 4 Bickford book. Is that something that 25 2 2 Colory Seems to me like you can't wing a dead 26	Page 90			Page 92
3 3 A Mr. Meyers had produced a ton of NTSB citings 4 4 Iulking about bolt torque, and I was interested 5 5 to see what those were beauses, as I told you 6 6 previously, that the wast, overwhelming majority 7 7 of bolt fatigue failures are due to insufficient 8 8 preload. So I had Nicole go through those 9 9 documents one by one and determine if any of 10 10 them were related to overtorquing. 11 11 Q And what did you determine? 12 12 A As I recall, I don't — Fin not sure. I 13 13 instances that were overtorquing. There may 14 14 have been one, but I don't — Fin not sure. I 15 15 would have to look. If you like. I can consult 16 16 my data and let you know. 17 17 Q Up to you after this but not at this time. But 18 18 A Lex and let you know. 19 19 A Some of the NTSB research that was performed is 19 y worked with hims since 2006, approximately. 20 20 Q Nay. Seems to me like you can't swing a dead 21 21 insufficient proload. 22 22 Q Okay. Seems to me like you can't swing a dead 23 23 car in this case without running into the 24 24 Bickford. 25 1 Ms. Schimpf located for you? 26 2 A No. I think everybody in my company has a copy 27 3 of Bickford. 28 A Yes. 29 9 Q Did you, yourself, read Mr. Meyers' deposition 19 10 transcript? 11 11 A Yes. I read every word of it. 11 12 A Yes. I read every word of it. 12 12 Q And this deposition transcript? 13 13 A Yes, I read Revery word of it. 14 14 Q And his deposition transcript? 15 15 A Yes. His deposition transcript? 16 16 Q Okay. How about Kevin Jones, your brother, what 17 17 was his nole in the creation of Exhibit 91? 18 18 A Lex See. One moment. Let me just kind of go 19 19 through it and I can give you a better idea. 20 20 Q Okay. How about Kevin Jones, your brother, what 17 17 was his nole in the creation of Exhibit 91? 18 18 A Lex See. One moment. Let me just kind of go 19 19 through it and I can give you a better idea. 21 21 A Kevin did some photography work. Kevin also did 22 22 See through it and I can give you a better idea. 22 22 Co A Revin has of in the creation o	_	1	1	
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24 24 searching on the metallurgical side, not on the 24 24 Q And by sitting next to the hot section, do you				
	-			-
25		1	24	Q And by sitting next to the hot section, do you
-	25	25		

24 (Pages 90 - 93)

Page 94		Page 96
1 1 mean in the cold section?	1 1	bolts, obviously they've changed colors. The
2 2 A Yes. It's in the cold section of the engine,	2 2	reason they've changed colors is due to
3 3 but it butts up to the hot section.	3 3	oxidation.
4 4 Q And where do you get the information that the	4 4	Q And are we talking about the bolts received in
5 5 operating temperatures are around 600 degrees	5 5	your custody that were broken during operation?
6 6 Fahrenheit? Where does that come from?	6 6	A Are we talking about the subject bolts?
7 7 A I received that information from Mr. Cheyne.	7 7	Q Right. I think we're in final agreement with
8 8 Q And how did he convey that information to you?	8 8	each other. But I just want to make sure that
9 9 A Actually, I recall him I think he looked it	9 9	you mean the bolts that you received that are
10 10 up based on the numbers, N1 and N2 section	10 10	the broken bolts and not any of the ones that
11 11 numbers, if I'm not mistaken. But you would	11 11	went through testing, were cleaned, or whatever,
12 12 have to ask him for sure.	12 12	that were still installed in the engines that
13 13 Q Okay. Do you have an indication of how often or	13 13	you may have gotten from Mr. Meyer?
14 14 how for what duration of time the diffuser	14 14	A I'm sorry. I'm completely confused. I don't
15 15 bolts at issue in this case are subjected to	15 15	3
16 16 those temperatures, meaning in the 600 degree	16 16	,
17 17 Fahrenheit range.	17 17	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
18 18 A No, not exactly, but gauging the oxidation	18 18	8 , 1
19 19 layers that's growing, I would say they're up	19 19	MR. MARIANI: Objection of the form.
20 20 there probably for most of the time the engine	20 20	
21 21 is operating.	21 21	- · · · · · · · · · · · · · · · · · · ·
22 22 Q Okay.	22 22	1 18 1
23 23 A So I don't know. Defer those questions to	23 23	3
24 24 Mr. Cheyne.	24 24	· \\\
25	25	
Page 95	1 1	Page 97
1 1 Q Well, you said your conclusion is also based on	1 1	BY MS. RATHKE:
1 1 Q Well, you said your conclusion is also based on 2 2 the amount of oxidation you're seeing. So tell	1 1 2 2	BY MS. RATHKE:  Q Okay. So the oxidation the bolts that you
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1 1 Q Well, you said your conclusion is also based on 2 2 the amount of oxidation you're seeing. So tell 3 3 me how that contributes to your understanding 4 4 that the diffuser bolts are subject to 5 5 600 degree Fahrenheit temperatures most of the	3 3 4 4 5 5	BY MS. RATHKE:  Q Okay. So the oxidation the bolts that you saw that experienced oxidation, those would have included the bolts that broke in Menard's engines; fair?
1 1 Q Well, you said your conclusion is also based on 2 2 the amount of oxidation you're seeing. So tell 3 3 me how that contributes to your understanding 4 4 that the diffuser bolts are subject to 5 5 600 degree Fahrenheit temperatures most of the 6 6 time during operation. What do you mean by	3 3 4 4 5 5 6 6	BY MS. RATHKE:  Q Okay. So the oxidation the bolts that you saw that experienced oxidation, those would have included the bolts that broke in Menard's engines; fair?  A How about I sum it up this way? Every bolt that
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	Page 98			Page 100
1 1	_	1	1	
2 2	MR. MARIANI: Objection. Misstates his	2	2	oxidation, the phrase you used a few moments
3 3	testimony.	3	3	ago.
4 4	Go ahead.	4	4	A Normal surface oxidation is the because these
5 5	THE DEPONENT: What I'm telling you quite	5	5	bolts operate at temperature these bolts are
6 6	simply is the bolts that were in service on the	6	6	designed to operate at a lot higher temperature.
7 7	subject engines all experienced some degree of	7	7	But what happens over time is you get selective
8 8	surface oxidation.	8	8	depletion of elements at the surface layers, and
9 9	BY MS. RATHKE:	9	9	it occurs during normal operation at
10 10	Q Did you personally observe any of the bolts that	10	10	temperature. It's expected.
11 11	came out of Menard's diffusers that were not	11	11	Q And are you able to quantify the magnitude and
12 12	broken?	12	12	duration of the vibrations that these diffuser
13 13	A Yes.	13	13	bolts are exposed to in service?
14 14	Q Which ones?	14	14	A Unfortunately, no. That would require strain
15 15	MR. MARIANI: Objection. Hold on a second.	15	15	gauging and putting accelerometers onto a
16 16	Objection to the form.	16	16	working engine and doing a significant amount of
17 17	Let me just note for the witness. If you	17	17	testing, unless Pratt & Whitney would've been
18 18	want to refer to your report at any time, unless	18	18	kind enough to give us that information.
19 19	you're directed not to refer to it, you can feel	19	19	Q Did you ask?
20 20	free to refer to your report at any time.	20	20	A Yes.
21 21	BY MS. RATHKE:	21	21	Q Tell me about how you asked for that
22 22	Q You can refer to the Holy Bible for all I care.	22	22	information.
23 23	I just want to know what bolts you looked at.	23	23	A I just asked Mr. Mariani if that was possible.
24 24	A The ones that were removed in December 2019.	24	24	Q And was it?
25		25		
	Page 99			Page 101
1 1	Q And which ones are they? I mean, you give them	1	1	A I don't think he was able I don't know if he
2 2	numbers, correct? Which ones?	2	2	asked for it or not. You would have to take it
3 3		3	3	up with him. He said he would look into it.
4 4	Okay. From 687: 2, 3, 4, 5, 7, 8, 9, 10,	4		Q Okay. And have you ever communicated with
5 5	12, 13, 14, 15, 16, 19.	5	5	anybody at Pratt & Whitney about any aspect of
6 6	From 545: 11, 13, 20, 21, 22.	6	6	this case?
7 7	From 544: 1, 2, 3, 5, 6, 7, 10, 12, 13,	7	7	A No, not at Pratt & Whitney.
8 8	22.	8	8	Q And I take it that knowing about the operating
9 9	MS. RATHKE: Mr. Court Reporter, were you	9	9	conditions and being able to quantify the
10 10	able to follow that?	10	10	operating conditions to which these bolts were
11 11	COURT REPORTER: Yes, ma'am.	11	11	exposed, that would help the analysis of trying
12 12	BY MS. RATHKE:	12	12	to figure out what happened to them and what
13 13		13	13	caused them to break?
14 14	your custody?	14	14	MR. MARIANI: Objection. Vague.
15 15	MR. MARIANI: Objection to the form as to	15	15	THE DEPONENT: I think that we have enough
16 16	"custody."	16	16	information right now to come to a good
17 17	· ·	17	17	engineering conclusion. More information would
18 18	question is.	18	18	be noteworthy, but I don't think it would change
19 19	THE DEPONENT: They were brought to my	19	19	any opinions at this point.
20 20		20	20	BY MS. RATHKE:
101 01		21	21	Q Your report, Exhibit 91, is dated February 21,
21 21				
21 21 22 22		22	22	2020. When did you perform the testing
	BY MS. RATHKE:			2020. When did you perform the testing described in Exhibit 91?
22 22	BY MS. RATHKE:  Q For what duration of time did you do that?	22 23	23	

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	Page 102			Page 104
1 1	testing in here.	1	1	this case?
2 2	Q Let me just short circuit this.	2	2	A Yes.
3 3	Is it fair to say that you conducted the	3	3	Q And what was the conclusion of that inquiry?
4 4	sum and substance of the testing set forth in	4	4	A We didn't see evidence of galvanic corrosion.
5 5	Exhibit 21 in Exhibit 91 before	5	5	Q Did you investigate the possibility that
6 6	February 21, 2020 when the exhibit is dated and	6	6	harmonic vibrational modes exacerbated the
7 7	was produced but after receiving Menard's expert	7	7	cracking of the bolts?
8 8	reports on December 20, 2019? Between those two	8	8	MR. MARIANI: I couldn't hear the question.
9 9	periods of time.	9	9	Please read it back.
10 10	A Yes. That would be a fair statement.	10	10	BY MS. RATHKE:
11 11	Q Okay. Did you do any investigation or testing	11	11	Q Did you investigate the possibility that
12 12	that did not make its way and is not mentioned	12	12	harmonic vibrational modes exacerbated the
13 13	in Exhibit 91?	13	13	contracting cracking of the bolts?
14 14	A No.	14	14	A Well, yes. And that goes right back to the use
15 15	Q Did you ever investigate I'm going to ask you	15	15	of titanium, because the titanium is going to
16 16	a couple things. I'm going to ask you whether	16	16	change the natural frequency of the diffuser and
17 17	you investigated them. Okay?	17	17	it's going to lower the natural frequency of the
18 18	,	18	18	system right there. And by lowering the natural
19 19	that the bolt failures in this case were caused	19	19	frequency of the system, it's going to be more
20 20	by differential thermal expansion of the joint,	20	20	susceptible to resonant frequencies. So yes, I
21 21	particularly with respect to the fact that the	21	21	did investigate that.
22 22	diffuser block was made from titanium?	22	22	Q And did you investigate the possibility that a
23 23	A Yes. To the extent that I could, yes, I did.	23	23	manufacturing defect caused the bolt failures?
24 24	Q And what did that investigation consist of?	24	24	A Yes, I did.
25		25		
	Page 103			Page 105
1 1				_
	A Well, I think we've already talked about it	1		Q What was your conclusion?
2 2	A Well, I think we've already talked about it earlier today. We looked at the fact that it's	2	2	<ul><li>Q What was your conclusion?</li><li>A I think it's contributory in this particular</li></ul>
2 2 3 3	A Well, I think we've already talked about it earlier today. We looked at the fact that it's made out of titanium. We talked about the fact	3	2	<ul><li>Q What was your conclusion?</li><li>A I think it's contributory in this particular case.</li></ul>
2 2 3 3 4 4	A Well, I think we've already talked about it earlier today. We looked at the fact that it's made out of titanium. We talked about the fact that its stiffness is half that of steel and how	2 3 4	2 3 4	<ul><li>Q What was your conclusion?</li><li>A I think it's contributory in this particular case.</li><li>Q Page 6 of your report, Exhibit 91, so page 7 of</li></ul>
2 2 3 3 4 4 5 5	A Well, I think we've already talked about it earlier today. We looked at the fact that it's made out of titanium. We talked about the fact that its stiffness is half that of steel and how that would affect the stiffness of the joint.	2 3 4 5	2 3 4 5	<ul> <li>Q What was your conclusion?</li> <li>A I think it's contributory in this particular case.</li> <li>Q Page 6 of your report, Exhibit 91, so page 7 of the PDF.</li> </ul>
2 2 3 3 4 4 5 5 6 6	A Well, I think we've already talked about it earlier today. We looked at the fact that it's made out of titanium. We talked about the fact that its stiffness is half that of steel and how that would affect the stiffness of the joint.  I really became interested in that a lot	2 3 4 5 6	2 3 4 5 6	<ul> <li>Q What was your conclusion?</li> <li>A I think it's contributory in this particular case.</li> <li>Q Page 6 of your report, Exhibit 91, so page 7 of the PDF.</li> <li>A I have it.</li> </ul>
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2 2 3 3 4 4 5 5 6 6 7 7 8 8	A Well, I think we've already talked about it earlier today. We looked at the fact that it's made out of titanium. We talked about the fact that its stiffness is half that of steel and how that would affect the stiffness of the joint.  I really became interested in that a lot because Mr. Meyers testified to something that's just physically incorrect. He said the joint	2 3 4 5 6 7 8	2 3 4 5 6 7 8	<ul> <li>Q What was your conclusion?</li> <li>A I think it's contributory in this particular case.</li> <li>Q Page 6 of your report, Exhibit 91, so page 7 of the PDF.</li> <li>A I have it.</li> <li>Q Specifically referring to Figure 3. Do you observe so what's being depicted</li> </ul>
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27 (Pages 102 - 105)

		Page 106			Page 108
1	1 0	Do you have an understanding as to	1	1	transmitted through the tip of the nut, I would
		One moment. My lights just went out. Sorry.	2		tend I think I'll predicate it, I think I
3		Do you have an understanding as to why the	3	3	agree with you.
	4	standard placement of the nut is within one or	4	4	Q Okay. Let me think of a better and more
5	5	two threads of the end of the bolt? Why is that	5	5	coherent way to say this, because perfectly
	6	the installation point?	6		candidly, it's been a long time since I took a
7	7 A	Is your question why one or two threads stick	7	7	science class.
8	8	out the end of the nut?	8	8	So let me say that is it fair to say
9	9 Q	Yes.	9	9	that if a bolt if a nut is fastened further
10		Is that it?	10	10	up on the bolt, the bolt will experience
11	11	Well, No. 1, you want to have the bolt run	11	11	different physical forces than if the nut is
12	12	all the way through the nut so you get full	12	12	fastened within the last threads or two the way
13	13	thread engagement. And then you typically want	13	13	that it's supposed to be?
14	14	to go at least one thread below the end of the	14	14	A If I'm understanding your question correctly,
15	15	bolt so you're out of the run end area of the	15	15	no.
16	16	thread. So a proper joint or proper assembly	16	16	Q I'm trying to find a good way to communicate
17	17	would use a bolt that penetrates completely	17	17	this.
18	18	through the nut.	18	18	A You can draw me a picture.
19	19 Q	And is it the case that where a nut sits on the	19	19	Q Can I, though? I mean, I don't know that I can.
20	20	bolt in service affects the forces that the bolt	20	20	I mean all right. I'll try.
21	21	is exposed to?	21	21	I'm a bolt. This is me.
22	22 A	I don't understand that question. I'm sorry.	22	22	A And when we're done here, can we take a quick
23	23 Q	Sure.	23	23	lunch break?
24	24	So let's say that you had the nut engaged	24	24	Q Yeah.
25			25		
		5 405			
		Page 107			Page 109
1	1	much further up on the bolt so you had lots of	1	1	Page 109 Okay. I'm a bolt. Do you see I'm a bolt
2	2	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you	1 2		Okay. I'm a bolt. Do you see I'm a bolt here?
2 3	2 3	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you understand me so far?			Okay. I'm a bolt. Do you see I'm a bolt here?  A Yes.
2 3 4	2 3 4 A	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you understand me so far?  Yes. Lots of threads sticking through the nut,	2 3 4	2 3 4	Okay. I'm a bolt. Do you see I'm a bolt here?  A Yes.  Q Okay. I'm a nut. Look at me, I'm a nut. This
2 3 4 5	2 3 4 A 5	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you understand me so far?  Yes. Lots of threads sticking through the nut, correct.	2 3 4 5	2 3 4 5	Okay. I'm a bolt. Do you see I'm a bolt here?  A Yes.  Q Okay. I'm a nut. Look at me, I'm a nut. This is me.
2 3 4 5 6	2 3 4 A 5 6 Q	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you understand me so far?  Yes. Lots of threads sticking through the nut, correct.  That's right. Yeah.	2 3 4 5 6	2 3 4 5 6	Okay. I'm a bolt. Do you see I'm a bolt here?  A Yes.  Q Okay. I'm a nut. Look at me, I'm a nut. This is me.  A Yeah.
2 3 4 5 6 7	2 3 4 A 5 6 Q 7	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you understand me so far?  Yes. Lots of threads sticking through the nut, correct.  That's right. Yeah.  In that instance, would it be fair to say	2 3 4 5 6 7	2 3 4 5 6 7	Okay. I'm a bolt. Do you see I'm a bolt here?  A Yes.  Q Okay. I'm a nut. Look at me, I'm a nut. This is me.  A Yeah.  Q Just nutting it up over here.
2 3 4 5 6 7 8	2 3 4 A 5 6 Q 7 8	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you understand me so far?  Yes. Lots of threads sticking through the nut, correct.  That's right. Yeah. In that instance, would it be fair to say that, functionally speaking, you are using a	2 3 4 5 6 7 8	2 3 4 5 6 7 8	Okay. I'm a bolt. Do you see I'm a bolt here?  A Yes.  Q Okay. I'm a nut. Look at me, I'm a nut. This is me.  A Yeah.  Q Just nutting it up over here. So this is Bolt No. 1. Now I'm going to
2 3 4 5 6 7 8 9	2 3 4 A 5 6 Q 7 8	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you understand me so far?  Yes. Lots of threads sticking through the nut, correct.  That's right. Yeah.  In that instance, would it be fair to say that, functionally speaking, you are using a much shorter bolt than the full length of what	2 3 4 5 6 7 8 9	2 3 4 5 6 7 8 9	Okay. I'm a bolt. Do you see I'm a bolt here?  A Yes.  Q Okay. I'm a nut. Look at me, I'm a nut. This is me.  A Yeah.  Q Just nutting it up over here. So this is Bolt No. 1. Now I'm going to draw Bolt No. 2 and Nut No. 2.
2 3 4 5 6 7 8 9	2 3 4 A 5 6 Q 7 8 9	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you understand me so far?  Yes. Lots of threads sticking through the nut, correct.  That's right. Yeah.  In that instance, would it be fair to say that, functionally speaking, you are using a much shorter bolt than the full length of what that bolt would be? If you're able to decipher	2 3 4 5 6 7 8 9 10	2 3 4 5 6 7 8 9	Okay. I'm a bolt. Do you see I'm a bolt here?  A Yes.  Q Okay. I'm a nut. Look at me, I'm a nut. This is me.  A Yeah.  Q Just nutting it up over here. So this is Bolt No. 1. Now I'm going to draw Bolt No. 2 and Nut No. 2. Okay. Bolt 1 versus Bolt 2. Do you see
2 3 4 5 6 7 8 9 10	2 3 4 A 5 6 Q 7 8 9 10	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you understand me so far?  Yes. Lots of threads sticking through the nut, correct.  That's right. Yeah.  In that instance, would it be fair to say that, functionally speaking, you are using a much shorter bolt than the full length of what that bolt would be? If you're able to decipher what I'm saying.	2 3 4 5 6 7 8 9 10	2 3 4 5 6 7 8 9 10 11	Okay. I'm a bolt. Do you see I'm a bolt here?  A Yes.  Q Okay. I'm a nut. Look at me, I'm a nut. This is me.  A Yeah.  Q Just nutting it up over here. So this is Bolt No. 1. Now I'm going to draw Bolt No. 2 and Nut No. 2. Okay. Bolt 1 versus Bolt 2. Do you see what I'm saying?
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2 3 4 5 6 7 8 9 10 11 12 13	2 3 4 A 5 6 Q 7 8 9 10 11 12 13	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you understand me so far?  Yes. Lots of threads sticking through the nut, correct.  That's right. Yeah.  In that instance, would it be fair to say that, functionally speaking, you are using a much shorter bolt than the full length of what that bolt would be? If you're able to decipher what I'm saying.  MR. MARIANI: Objection of the form. You can answer.	2 3 4 5 6 7 8 9 10 11 12 13	2 3 4 5 6 7 8 9 10 11 12 13	Okay. I'm a bolt. Do you see I'm a bolt here?  A Yes.  Q Okay. I'm a nut. Look at me, I'm a nut. This is me.  A Yeah.  Q Just nutting it up over here. So this is Bolt No. 1. Now I'm going to draw Bolt No. 2 and Nut No. 2. Okay. Bolt 1 versus Bolt 2. Do you see what I'm saying?  A Okay. So you have two different-sized joints essentially.
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2 3 4 5 6 7 8 9 10 11 12 13 14 15	2 3 4 A 5 6 Q 7 8 9 10 11 12 13 14	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you understand me so far?  Yes. Lots of threads sticking through the nut, correct.  That's right. Yeah.  In that instance, would it be fair to say that, functionally speaking, you are using a much shorter bolt than the full length of what that bolt would be? If you're able to decipher what I'm saying.  MR. MARIANI: Objection of the form. You can answer.  THE DEPONENT: Well, the bolt wouldn't necessarily be shorter. It depends on the joint	2 3 4 5 6 7 8 9 10 11 12 13 14 15	2 3 4 5 6 7 8 9 10 11 12 13 14 15	Okay. I'm a bolt. Do you see I'm a bolt here?  A Yes.  Q Okay. I'm a nut. Look at me, I'm a nut. This is me.  A Yeah.  Q Just nutting it up over here. So this is Bolt No. 1. Now I'm going to draw Bolt No. 2 and Nut No. 2. Okay. Bolt 1 versus Bolt 2. Do you see what I'm saying?  A Okay. So you have two different-sized joints essentially.  Q Well, I kind of meant to make them the same length.
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	2 3 4 A A 5 5 6 6 Q 7 8 9 110 111 112 113 114 115 116	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you understand me so far?  Yes. Lots of threads sticking through the nut, correct.  That's right. Yeah.  In that instance, would it be fair to say that, functionally speaking, you are using a much shorter bolt than the full length of what that bolt would be? If you're able to decipher what I'm saying.  MR. MARIANI: Objection of the form.  You can answer.  THE DEPONENT: Well, the bolt wouldn't necessarily be shorter. It depends on the joint that it's being past through.	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	Okay. I'm a bolt. Do you see I'm a bolt here?  A Yes.  Q Okay. I'm a nut. Look at me, I'm a nut. This is me.  A Yeah.  Q Just nutting it up over here. So this is Bolt No. 1. Now I'm going to draw Bolt No. 2 and Nut No. 2. Okay. Bolt 1 versus Bolt 2. Do you see what I'm saying?  A Okay. So you have two different-sized joints essentially.  Q Well, I kind of meant to make them the same length.  A You wanted them to be the same length. Okay.
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	2 3 4 A A 5 5 6 6 Q 7 8 9 10 111 112 113 114 115 116 117 H	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you understand me so far?  Yes. Lots of threads sticking through the nut, correct.  That's right. Yeah.  In that instance, would it be fair to say that, functionally speaking, you are using a much shorter bolt than the full length of what that bolt would be? If you're able to decipher what I'm saying.  MR. MARIANI: Objection of the form.  You can answer.  THE DEPONENT: Well, the bolt wouldn't necessarily be shorter. It depends on the joint that it's being past through.  BY MS. RATHKE:	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	Okay. I'm a bolt. Do you see I'm a bolt here?  A Yes.  Q Okay. I'm a nut. Look at me, I'm a nut. This is me.  A Yeah.  Q Just nutting it up over here. So this is Bolt No. 1. Now I'm going to draw Bolt No. 2 and Nut No. 2. Okay. Bolt 1 versus Bolt 2. Do you see what I'm saying?  A Okay. So you have two different-sized joints essentially.  Q Well, I kind of meant to make them the same length.  A You wanted them to be the same length. Okay. So you're saying if I put a longer bolt
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	2 3 4 A A 5 5 6 Q 7 8 8 9 110 111 112 113 114 115 116 117 H	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you understand me so far?  Yes. Lots of threads sticking through the nut, correct.  That's right. Yeah.  In that instance, would it be fair to say that, functionally speaking, you are using a much shorter bolt than the full length of what that bolt would be? If you're able to decipher what I'm saying.  MR. MARIANI: Objection of the form.  You can answer.  THE DEPONENT: Well, the bolt wouldn't necessarily be shorter. It depends on the joint that it's being past through.  BY MS. RATHKE:  Q Sure. But the forces that are going to be	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	Okay. I'm a bolt. Do you see I'm a bolt here?  A Yes.  Q Okay. I'm a nut. Look at me, I'm a nut. This is me.  A Yeah.  Q Just nutting it up over here. So this is Bolt No. 1. Now I'm going to draw Bolt No. 2 and Nut No. 2. Okay. Bolt 1 versus Bolt 2. Do you see what I'm saying?  A Okay. So you have two different-sized joints essentially.  Q Well, I kind of meant to make them the same length.  A You wanted them to be the same length. Okay. So you're saying if I put a longer bolt through if I I'm trying to answer your
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	2 3 4 A A 5 6 Q 7 8 9 110 111 112 113 114 115 116 117 H 119 119	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you understand me so far?  Yes. Lots of threads sticking through the nut, correct. That's right. Yeah. In that instance, would it be fair to say that, functionally speaking, you are using a much shorter bolt than the full length of what that bolt would be? If you're able to decipher what I'm saying.  MR. MARIANI: Objection of the form. You can answer. THE DEPONENT: Well, the bolt wouldn't necessarily be shorter. It depends on the joint that it's being past through. BY MS. RATHKE: Sure. But the forces that are going to be acting on that bolt will be acting on the	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	Okay. I'm a bolt. Do you see I'm a bolt here?  A Yes.  Q Okay. I'm a nut. Look at me, I'm a nut. This is me.  A Yeah.  Q Just nutting it up over here. So this is Bolt No. 1. Now I'm going to draw Bolt No. 2 and Nut No. 2. Okay. Bolt 1 versus Bolt 2. Do you see what I'm saying?  A Okay. So you have two different-sized joints essentially.  Q Well, I kind of meant to make them the same length.  A You wanted them to be the same length. Okay. So you're saying if I put a longer bolt through if I I'm trying to answer your question.
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	2 3 4 A A 5 5 6 C 7 8 9 110 111 112 113 114 115 116 117 H 118 C 119 220	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you understand me so far?  Yes. Lots of threads sticking through the nut, correct. That's right. Yeah. In that instance, would it be fair to say that, functionally speaking, you are using a much shorter bolt than the full length of what that bolt would be? If you're able to decipher what I'm saying.  MR. MARIANI: Objection of the form. You can answer. THE DEPONENT: Well, the bolt wouldn't necessarily be shorter. It depends on the joint that it's being past through. BY MS. RATHKE: Q Sure. But the forces that are going to be acting on that bolt will be acting on the portion of the bolt that put it this way:	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	Okay. I'm a bolt. Do you see I'm a bolt here?  A Yes.  Q Okay. I'm a nut. Look at me, I'm a nut. This is me.  A Yeah.  Q Just nutting it up over here. So this is Bolt No. 1. Now I'm going to draw Bolt No. 2 and Nut No. 2. Okay. Bolt 1 versus Bolt 2. Do you see what I'm saying?  A Okay. So you have two different-sized joints essentially.  Q Well, I kind of meant to make them the same length.  A You wanted them to be the same length. Okay. So you're saying if I put a longer bolt through if I I'm trying to answer your question. What you're saying is let me present a
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	2 3 4 A A 5 5 6 6 Q 7 8 9 10 111 12 113 114 115 116 117 H 118 Q 20 21	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you understand me so far?  Yes. Lots of threads sticking through the nut, correct.  That's right. Yeah.  In that instance, would it be fair to say that, functionally speaking, you are using a much shorter bolt than the full length of what that bolt would be? If you're able to decipher what I'm saying.  MR. MARIANI: Objection of the form. You can answer.  THE DEPONENT: Well, the bolt wouldn't necessarily be shorter. It depends on the joint that it's being past through.  BY MS. RATHKE:  Q Sure. But the forces that are going to be acting on that bolt will be acting on the portion of the bolt that put it this way:  The forces that are acting on that bolted joint	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	Okay. I'm a bolt. Do you see I'm a bolt here?  A Yes.  Q Okay. I'm a nut. Look at me, I'm a nut. This is me.  A Yeah.  Q Just nutting it up over here. So this is Bolt No. 1. Now I'm going to draw Bolt No. 2 and Nut No. 2. Okay. Bolt 1 versus Bolt 2. Do you see what I'm saying?  A Okay. So you have two different-sized joints essentially.  Q Well, I kind of meant to make them the same length.  A You wanted them to be the same length. Okay. So you're saying if I put a longer bolt through if I I'm trying to answer your question. What you're saying is let me present a hypothetical.
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	2 3 4 A A 5 6 Q 7 8 9 110 111 112 113 114 115 116 117 H 118 Q 21 22	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you understand me so far?  Yes. Lots of threads sticking through the nut, correct.  That's right. Yeah.  In that instance, would it be fair to say that, functionally speaking, you are using a much shorter bolt than the full length of what that bolt would be? If you're able to decipher what I'm saying.  MR. MARIANI: Objection of the form.  You can answer.  THE DEPONENT: Well, the bolt wouldn't necessarily be shorter. It depends on the joint that it's being past through.  BY MS. RATHKE:  Sure. But the forces that are going to be acting on that bolt will be acting on the portion of the bolt that put it this way:  The forces that are acting on that bolted joint will not be acting on the portion of the bolt	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	Okay. I'm a bolt. Do you see I'm a bolt here?  A Yes.  Q Okay. I'm a nut. Look at me, I'm a nut. This is me.  A Yeah.  Q Just nutting it up over here. So this is Bolt No. 1. Now I'm going to draw Bolt No. 2 and Nut No. 2. Okay. Bolt 1 versus Bolt 2. Do you see what I'm saying?  A Okay. So you have two different-sized joints essentially.  Q Well, I kind of meant to make them the same length.  A You wanted them to be the same length. Okay. So you're saying if I put a longer bolt through if I I'm trying to answer your question. What you're saying is let me present a hypothetical.  Q Yes.
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	2 3 4 A A 5 6 Q 7 8 9 110 111 112 113 114 115 116 117 H 118 Q 20 21 22 22 23	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you understand me so far?  Yes. Lots of threads sticking through the nut, correct.  That's right. Yeah.  In that instance, would it be fair to say that, functionally speaking, you are using a much shorter bolt than the full length of what that bolt would be? If you're able to decipher what I'm saying.  MR. MARIANI: Objection of the form. You can answer.  THE DEPONENT: Well, the bolt wouldn't necessarily be shorter. It depends on the joint that it's being past through.  BY MS. RATHKE:  Q Sure. But the forces that are going to be acting on that bolt will be acting on the portion of the bolt that put it this way:  The forces that are acting on that bolted joint	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	Okay. I'm a bolt. Do you see I'm a bolt here?  A Yes.  Q Okay. I'm a nut. Look at me, I'm a nut. This is me.  A Yeah.  Q Just nutting it up over here. So this is Bolt No. 1. Now I'm going to draw Bolt No. 2 and Nut No. 2. Okay. Bolt 1 versus Bolt 2. Do you see what I'm saying?  A Okay. So you have two different-sized joints essentially.  Q Well, I kind of meant to make them the same length.  A You wanted them to be the same length. Okay. So you're saying if I put a longer bolt through if I I'm trying to answer your question. What you're saying is let me present a hypothetical.  Q Yes.
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	2 3 4 A A 5 6 Q 7 8 9 110 111 112 113 114 115 116 117 H 118 Q 20 21 22 23	much further up on the bolt so you had lots of bolt sticking out the end of the nut. Do you understand me so far?  Yes. Lots of threads sticking through the nut, correct.  That's right. Yeah.  In that instance, would it be fair to say that, functionally speaking, you are using a much shorter bolt than the full length of what that bolt would be? If you're able to decipher what I'm saying.  MR. MARIANI: Objection of the form. You can answer.  THE DEPONENT: Well, the bolt wouldn't necessarily be shorter. It depends on the joint that it's being past through.  BY MS. RATHKE:  Sure. But the forces that are going to be acting on that bolt will be acting on the portion of the bolt that put it this way: The forces that are acting on that bolted joint will not be acting on the portion of the bolt that's sticking out past the nut, correct?	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	Okay. I'm a bolt. Do you see I'm a bolt here?  A Yes.  Q Okay. I'm a nut. Look at me, I'm a nut. This is me.  A Yeah.  Q Just nutting it up over here. So this is Bolt No. 1. Now I'm going to draw Bolt No. 2 and Nut No. 2. Okay. Bolt 1 versus Bolt 2. Do you see what I'm saying?  A Okay. So you have two different-sized joints essentially.  Q Well, I kind of meant to make them the same length.  A You wanted them to be the same length. Okay. So you're saying if I put a longer bolt through if I I'm trying to answer your question. What you're saying is let me present a hypothetical.  Q Yes.  A If you have a one-inch piece and you put a bolt

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Page 110			Page 112
1 1 and another bolt sticks out a lot more, that's	1	1	clamped joints, are the same those forces
2 2 your question?		2	don't care where you put your nut, right?
3 3 Q You're with me.	3	3	A They don't care where you put your nut.
4 4 A The string development between the clamped	4	4	Q So the net forces operating on your bolted joint
5 5 surface is going to be the same.	5	5	are going to be the same no matter where you put
6 6 Q The string development between the clamped	6		your nut? The amount of force
7 7 surface is going to be the same. What does that		7	A I'm not trying to be difficult with you. I just
8 8 mean?		8	don't understand.
9 9 A That means the stress and strain in the clamped	9	9	Q Yeah, I don't believe that you are.
10 10 area is going to be the same.	10		So the physical forces caused by the
11 11 Q The stress and strain in the clamped area is	11		application will be the same across the two-bolt
12 12 going to be the same, but is the stress and	12		
13 13 strain between the bolt head and the clamped	13		correct?
14 14 area, that will be different as between the two			A I guess when you say "where the nut is
15 15 bolts because there's more length on one than	15		placed," because the nut if it's a joint, the
16 16 the other, correct?	16		•
17 17 A No.	17		what I don't understand that's where I'm
18 18 MR. MARIANI: Objection to the form.	18		losing you. And I'm trying to understand what
19 19 You can answer.	19		
	20		
20 20 THE DEPONENT: No. The part sticking out 21 21 the end of the nut doesn't have any effect,	21		because the nut is in the same place, if you
22 22 other than a mass effect.	22		
23 23 BY MS. RATHKE:	23		perspective, the forces are only going to be
	24		
24 24 Q Well, that's not true. If you've got a bolt,	25	24	active between the clamped members. Okay?
D 111			D 440
Page 111			Page 113
Page 111 1 1 and you've got part of it that's sticking off	1	1	Page 113 Q Yes.
	1		
1 1 and you've got part of it that's sticking off	2		Q Yes.
1 1 and you've got part of it that's sticking off 2 2 the end, the part that's sticking off the end is	2 3	2	<ul><li>Q Yes.</li><li>A So unless the amount of threading and shank</li></ul>
1 1 and you've got part of it that's sticking off 2 2 the end, the part that's sticking off the end is 3 3 absorbing and experiencing no relevant physical	2 3 4	2 3 4	<ul><li>Q Yes.</li><li>A So unless the amount of threading and shank ratio is different within the bolt, there's not</li></ul>
1 1 and you've got part of it that's sticking off 2 2 the end, the part that's sticking off the end is 3 3 absorbing and experiencing no relevant physical 4 4 forces pertaining to that clamping force,	2 3 4	2 3 4 5	<ul><li>Q Yes.</li><li>A So unless the amount of threading and shank ratio is different within the bolt, there's not going to be really any difference.</li></ul>
1 1 and you've got part of it that's sticking off 2 2 the end, the part that's sticking off the end is 3 3 absorbing and experiencing no relevant physical 4 4 forces pertaining to that clamping force, 5 5 correct?	2 3 4 5	2 3 4 5	<ul><li>Q Yes.</li><li>A So unless the amount of threading and shank ratio is different within the bolt, there's not going to be really any difference.</li><li>Q I agree with you.</li></ul>
1 1 and you've got part of it that's sticking off 2 2 the end, the part that's sticking off the end is 3 3 absorbing and experiencing no relevant physical 4 4 forces pertaining to that clamping force, 5 5 correct? 6 6 A I agree with you.	2 3 4 5 6	2 3 4 5 6 7	<ul> <li>Q Yes.</li> <li>A So unless the amount of threading and shank ratio is different within the bolt, there's not going to be really any difference.</li> <li>Q I agree with you. And the difference in these two scenarios,</li> </ul>
1 1 and you've got part of it that's sticking off 2 2 the end, the part that's sticking off the end is 3 3 absorbing and experiencing no relevant physical 4 4 forces pertaining to that clamping force, 5 5 correct? 6 6 A I agree with you. 7 7 Q All the force is being distributed on the part	2 3 4 5 6 7	2 3 4 5 6 7 8	<ul> <li>Q Yes.</li> <li>A So unless the amount of threading and shank ratio is different within the bolt, there's not going to be really any difference.</li> <li>Q I agree with you. And the difference in these two scenarios, if the bolt has a lot of hang off past the nut</li> </ul>
1 1 and you've got part of it that's sticking off 2 2 the end, the part that's sticking off the end is 3 3 absorbing and experiencing no relevant physical 4 4 forces pertaining to that clamping force, 5 5 correct? 6 6 A I agree with you. 7 7 Q All the force is being distributed on the part 8 8 of the bolt that's within the nut or higher;	2 3 4 5 6 7 8	2 3 4 5 6 7 8	<ul> <li>Q Yes.</li> <li>A So unless the amount of threading and shank ratio is different within the bolt, there's not going to be really any difference.</li> <li>Q I agree with you. And the difference in these two scenarios, if the bolt has a lot of hang off past the nut versus whether it doesn't, is that the bolt with</li> </ul>
1 1 and you've got part of it that's sticking off 2 2 the end, the part that's sticking off the end is 3 3 absorbing and experiencing no relevant physical 4 4 forces pertaining to that clamping force, 5 5 correct? 6 6 A I agree with you. 7 7 Q All the force is being distributed on the part 8 8 of the bolt that's within the nut or higher; 9 9 fair?	2 3 4 5 6 7 8 9	2 3 4 5 6 7 8 9 10	Q Yes. A So unless the amount of threading and shank ratio is different within the bolt, there's not going to be really any difference. Q I agree with you. And the difference in these two scenarios, if the bolt has a lot of hang off past the nut versus whether it doesn't, is that the bolt with a lot of hang off, that hang-off portion will
1 1 and you've got part of it that's sticking off 2 2 the end, the part that's sticking off the end is 3 3 absorbing and experiencing no relevant physical 4 4 forces pertaining to that clamping force, 5 5 correct? 6 6 A I agree with you. 7 7 Q All the force is being distributed on the part 8 8 of the bolt that's within the nut or higher; 9 9 fair? 10 10 A Or higher or you mean below the nut, if you	2 3 4 5 6 7 8 9 10	2 3 4 5 6 7 8 9 10	Q Yes. A So unless the amount of threading and shank ratio is different within the bolt, there's not going to be really any difference. Q I agree with you. And the difference in these two scenarios, if the bolt has a lot of hang off past the nut versus whether it doesn't, is that the bolt with a lot of hang off, that hang-off portion will not be eligible to absorb the forces being
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1 1 something or you have something accessible	1 1 engaged in the past. And, secondly, that the
2 2 there.	2 2 oxidation that occurs on the bolts in service is
3 3 THE DEPONENT: I'll tell you what, let me	3 3 going to change their frictional characteristics
4 4 go see. They were supposed to bring me	4 4 as well, and that's reflected in the literature
5 5 something. Let me go see. And if they haven't	5 5 that I provided.
6 6 gotten it here yet, then we can keep going if	6 6 Q And specifically what literature are you
7 7 it's good with you guys, until it shows up.	7 7 referring to in this moment?
8 8 MS. RATHKE: Okay. Report back.	8 8 A It's covered in both Shigley and Bickford, in
9 9 MR. MARIANI: We're just going to wait a	9 9 both of Bickford's books.
10 10 second for you then.	10 10 Q And could you spell "Shigley"?
11 11 MS. RATHKE: Yeah. We can go off while	11 11 A S-H-I-G-L-E-Y.
12 12 we're waiting, though.	12 12 Q Thank you.
13 13 MR. MARIANI: Go ahead.	13 13 All right. And now tell me about cause
14 14 (Off the record.)	14 14 No. 2, the manufacturing defect issue.
15 15 BY MS. RATHKE:	15 15 A Okay. Well, if you refer to the PWC report that
16 16 Q Mr. Jones, do you have an opinion to a	16 16 was published on DAO517, they made an
17 17 reasonable degree of scientific certainty as to	17 17 interesting discovery. They found evidence of a
18 18 what did cause these diffuser bolts to develop	18 18 high-temperature oxide layer that was developed
19 19 an initial fatigue crack that progressed into	19 19 during bolt manufacturing. Essentially it had
20 20 bolt failure?	20 20 to be developed during bolt manufacturing due to
21 21 A Yes.	21 21 the temperature that the oxide they discovered
22 22 Q Tell me what your belief is.	22 22 formed.
23 23 A My opinion is that, No. 1, it's related to	23 23 That oxide was subsequently rolled into the
24 24 reusing the bolts based upon our data. The data	24 24 threads when the thread was rolled following
25	25
Page 115	Page 117
1 1 suggests that reusing the bolts changes the	1 1 heat treatment. And that left a layer inside
2 2 frictional characteristics of the bolts that	2 2 the bolt in the threaded area of the bolt that
3 3 will then result in a change in preload of the	3 3 was then compressed into the area of the bolt
4 4 bolts.	4 4 that left a stress concentration in the bolt
5 5 Also, the data and my analysis suggests	5 5 that would make it more likely for fatigue
6 6 that there's a manufacturing defect in the bolts	6 6 cracks to initiate.
7 7 themselves. And both of those contributed to	7 7 We found the same evidence present on the
8 8 the initiation of the fatigue crack.	8 8 subject bolts from the Menard engines.
9 9 Q Let's start with contributing cause No. 1,	9 9 Q On how many bolts from the Menard engines?
10 10 reusing the bolts changes the frictional	10 10 A The ones that we examined that were available to
11 11 characteristics which changes the preload. Why	11 11 us.
11 11 characteristics which changes the preload. Why 12 12 does that happen? What causes that in your	
	11 11 us.
12 12 does that happen? What causes that in your	11 11 us. 12 12 Q So all of them, the ones that you listed for me
12 12 does that happen? What causes that in your 13 13 opinion?	11 11 us. 12 12 Q So all of them, the ones that you listed for me 13 13 earlier?
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P. 110			D 1200
Page 118	1	1	Page 120 characteristic of those bolts making them more
<ul><li>1 1 to, are those in your expert materials?</li><li>2 2 A They were provided by your experts.</li></ul>	2	2	prone to failure, what percentage of the bolts
3 3 Q Okay. So how many all right.	3	3	would you expect strike that.
4 4 Is it your understanding or belief that	4	4	Given both of the factors that you
5 5 this manufacturing defect occurs across all such	5	5	explained to me strike that too.
6 6 bolts that have been manufactured, or it's an		6	You indicated that there was a third factor
7 7 episodic manufacturing defect that occurs with	1	7	that you wanted to discuss as well but that you
8 8 some production runs?	8	8	would answer my question first. So what's the
9 9 A I can't answer that question. All I can tell		9	third factor?
10 10 you is the evidence that I've seen. I don't	10		
11 11 know. I mean, these bolts are most likely made	11		or tell you the amount of what we would call in
-	12		engineering terms accumulated damage to the
, , , , , , , , , , , , , , , , , , , ,	13		
	1		bolts prior to them being removed and
	14 15		reinstalled by Dallas Airmotive.  In other words, because this is a
15 15 I don't know what the manufacturing process			
16 16 is; however, I suspect the bolts are made in	16		high-cycle fatigue failure, the fatigue crack itself does not initiate until well well into
17 17 batches. I don't know how frequently those	17		
18 18 batches are made, but we did see evidence of a	18		the life of the failure. In other words,
19 19 high-temperature oxide layer on the subject	19		typically speaking, a high-cycle fatigue crack
20 20 bolts, similar to the bolt from DAO517. And	20		, , , , , , , , , , , , , , , , , , ,
21 21 that bolt, as you recall, was not installed by	21		10 percent, approximately, of the failure. And
22 22 Dallas Airmotive. It was installed by Pratt &	22		the remaining 90 percent of the time goes into
23 23 Whitney. And the same issue was present on our	23		initiation.
24 24 bolts. 25	24 25	24	So I can't tell you that how much damage
23	23		
Page 119	1	1	Page 121
1 1 Q Okay. And did you see evidence of this	1 2		was accumulated by the bolts in prior
1 1 Q Okay. And did you see evidence of this 2 2 manufacturing defect on all SEM images for the	2	2	was accumulated by the bolts in prior operations.
1 1 Q Okay. And did you see evidence of this 2 2 manufacturing defect on all SEM images for the 3 3 subject bolts that you observed or were there	2 3	2	was accumulated by the bolts in prior operations.  Q Okay. So the first factor that you told me,
1 1 Q Okay. And did you see evidence of this 2 2 manufacturing defect on all SEM images for the 3 3 subject bolts that you observed or were there 4 4 images where you did not observe this	2 3 4	2 3 4	was accumulated by the bolts in prior operations.  Q Okay. So the first factor that you told me, reusing the bolts changes the frictional
1 1 Q Okay. And did you see evidence of this 2 2 manufacturing defect on all SEM images for the 3 3 subject bolts that you observed or were there 4 4 images where you did not observe this 5 5 manufacturing defect?	2 3 4 5	2 3 4 5	was accumulated by the bolts in prior operations.  Q Okay. So the first factor that you told me, reusing the bolts changes the frictional characteristics of the bolts which changes the
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1 1 Q Okay. And did you see evidence of this 2 2 manufacturing defect on all SEM images for the 3 3 subject bolts that you observed or were there 4 4 images where you did not observe this 5 5 manufacturing defect? 6 6 A It's only visible on the SEM images of the bolt 7 7 cross-sections that are in high-enough suitable 8 8 magnification to see it. 9 9 Q And were there any SEM cross-sections where you 10 10 did not observe but you could expect to be able 11 11 to where you did not observe the manufacturing 12 12 defect? 13 13 A As I sit here I don't recall exactly, but I 14 14 suspect I expect it's going to be visible on 15 15 all of them. 16 16 Q Okay. And the Pratt & Whitney report that you 17 17 refer to, is that the report that references the 18 18 bird strike? 19 19 A No. It's the materials laboratory report. 20 20 The bird strike was DOA508. 21 21 Q And which report are you referring to? 22 22 A DOA517.	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	was accumulated by the bolts in prior operations.  Q Okay. So the first factor that you told me, reusing the bolts changes the frictional characteristics of the bolts which changes the preload makes them more susceptible to failure. In what percentage of the bolt the diffuser bolt population would you expect reusing the bolts to change the frictional characteristic of those bolts? Is it across the population or is it a subset?  A I would expect some change across the population. The range of that change I don't know.  Q So given all right.  So given that you would expect cause No. 1, the change to the frictional characteristics on the bolts on reuse, which you expect to occur to some degree across the population, and given the manufacturing defects which you observed 100 percent of the time when it was possible to observe it, what percentage of bolts would you

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1 1 hypothetical.	1	1	THE DEPONENT: I'm sorry. I was looking
2 2 You can answer.	2	2	something up.
3 3 THE DEPONENT: Well, that goes back to the	3	3	MR. MARIANI: So can we let the witness
4 4 load case scenario, and then you're getting into	4	4	please complete the prior answer before we move
5 5 details related to the exact preload	5	5	on?
6 6 distribution on the joint and you're getting	6	6	THE DEPONENT: I'm trying to find it. One
7 7 into issues related to the statistical ability	7	7	moment.
8 8 to reproduce preload from one bolt to the next.	8	8	So I'm looking at this, and if you look at
9 9 So I couldn't give you an exact answer.	9	9	the failures that we're aware of right now, it
10 10 What I can tell you is that this the way	10	10	seems that the Menard engines 544 and 545 have
11 11 these failures are occurring suggests to me that	11	11	the largest number of hours on them, and they've
12 12 reusing the bolts, and potentially even some of	12	12	also experienced the largest number of failures.
13 13 the new bolts, because we've seen failures of	13	13	DAO687, for example, has 7,563 hours and
14 14 brand-new bolts on engines as well, that it's	14	14	has three bolt failures. Well, that's identical
15 15 probably what I would call right on the edge of	15	15	to DAO517 that experienced three bolt failures
16 16 design.	16	16	that have 7,200 hours. So I suspect what you're
17 17 BY MS. RATHKE:	17	17	seeing is that statistical a statistical
18 18 Q What does that mean?	18	18	variation based on time.
19 19 A Meaning that it's in the statistically in the	19	19	BY MS. RATHKE:
20 20 statistical area where you're going to get	20	20	Q So do you think that all engines that get to a
21 21 occasional failures even on new bolts, based on	21	21	point in overhaul use similar to the engines 544
22 22 the evidence I've seen so far.	22	22	and 545? If your theory is right, should they
23 23 Q So I forget exactly what the numbers are, but	23	23	also be experiencing broken diffuser bolts?
24 24 fair to say that the majority of bolt failures	24	24	A It's entirely possible. The other variable that
25	25		
Page 123			Page 125
1 1 have occurred on these three Menard's engines?	1	1	you have to consider is the exact procedure
2 2 MR. MARIANI: Is there a question or are	2	2	and torquing procedure that would be applied.
3 3 you asking him if he agrees with you?	3	3	Okay.
4 4 BY MS. RATHKE:	4	4	So everyone follows the book, but does
5 5 Q Do you agree with me?	5	5	Dallas Airmotive wait three minutes between
6 6 A The majority of the the bolt failures that	6	6	tightening the bolts and Pratt & Whitney wait 7?
7 7 we're aware of, I think the majority of them	7	7	Those things, when you're getting down in the
8 8 are the ones that we're aware of, I think the	8	8	weeds of failures that are these low high-cycle
9 9 majority of them have occurred on Menard's	9	9	fatigue failures, those are the things you have
10 10 engines.	10	10	to start considering. So there could be small,
11 11 Q Why is that?	11	11	small, you know, in well, what you would
12 12 A Well, if you look at the data, one thing I'll	12	12	consider relatively inconsequential changes to
13 13 tell you is, No. 1, the Menard's engines were	13	13	the procedure or just following the procedure
14 14 right at overhaul, at their overhaul or close to	14	14	and doing it under a slightly different time
15 15 their overhaul requirements. Let me	15	15	frame because this case is heated up. That's
16 16 double-check my data here.	16	16	all going to have an effect on the preload and
17 17 And they were also high-time engines,	17	17	you could be seeing some of that stack up going
18 18 relatively speaking.	18	18	on right here.
19 19 Q But we're certainly not alone in that; fair to	19	19	Q Do you have a sense for how many PW530A engines
20 20 say? There are, I don't know, a hundred such	20	20	are in the field in use today?
	21	21	A No.
21 21 engines that have been overhauled, right?	21		
21 21 engines that have been overhauled, right? 22 22 MR. MARIANI: Did you get to complete your	21 22	22	Q Sorry. Go ahead.
22 22 MR. MARIANI: Did you get to complete your 23 23 prior answer, Mr. Jones, when you said you were	22		Q Sorry. Go ahead. A I know it's over 700.
22 22 MR. MARIANI: Did you get to complete your	22 23	23	-

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Page 126		Page 128
1 1 correct?	1 1	Airmotive performs.
2 2 MR. MARIANI: Objection of the form.	2 2	BY MS. RATHKE:
3 3 THE DEPONENT: I think one set of engines	3 3	Q Okay. Are you aware that Dallas Airmotive has
4 4 was '03 and one set of engines was '06.	4 4	performed are you aware that other than Pratt
5 5 BY MS. RATHKE:	5 5	& Whitney, Dallas Airmotive is the only approved
6 6 Q Okay. But is Pratt & Whitney making 530A	6 6	overhaul company for Pratt & Whitney 530A
7 7 engines anymore?	7 7	engines? Are you aware of that?
8 8 A I don't know.	8 8	MR. MARIANI: Objection to the form.
9 9 Q Okay. Do you have any sense for of the	9 9	You can answer.
10 10 population of 530A engines in the field, what	10 10	THE DEPONENT: I'm aware of Dallas
11 11 their use history is going to be like? I mean,	11 11	Airmotive and PW West Virginia, the two overhaul
12 12 how old are these engines?	12 12	facilities. There could be more, but those are
13 13 A I don't know. It seems like there's a big	13 13	the ones that I'm aware of.
14 14 variance because I think DAO169, which is an	14 14	BY MS. RATHKE:
15 15 earlier engine than any of the subject engines,	15 15	Q Well, I think you say it in your report that
16 16 it only had 4,000 hours on it in 2018 or 2019.	16 16	other than Pratt & Whitney, Dallas Airmotive is
17 17 So you're going to see a big variance.	17 17	the only FAA approved overhaul shop for these
18 18 Q I see. So is it your belief that the 544 and	18 18	engines, correct?
19 19 the 545 engines that Menard's owned, that these	19 19	A I believe so.
20 20 are the highest-use engines in the fleet of	20 20	Q Okay. So I get that you don't have a precise
21 21 Pratt & Whitney 530A engines? Is that your	21 21	sense for how many 530A engine overhauls that
22 22 understanding?	22 22	Pratt & Whitney has performed, but certainly you
23 23 A No, I never said that.	23 23	know that the number exceeds 100, correct?
24 24 Q Is it your understanding?	24 24	A According to Mr. Cheyne's report, Dallas
25	25	
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1 1 A No. I just say of the population of the sample	1 1	Airmotive has completed 150 overhauls.
2 2 of engines that we have, those engines are on	2 2	Q Okay. And so to be overhauled, the engines must
3 3 the the engines with the most failures are on	3 3	have been in use for at least 4,000 flight
4 4 the high end of ours.	4 4	hours; is that correct? Is that your
5 5 Q Okay. But I guess what I'm asking about, is the	5 5	understanding?
6 6 population of other engines that exist in the	6 6	A Well, under a normal overhaul, yes. But if
7 7 world, which is greater than five, even	7 7	there's other reasons for it to come in to be
8 8 considerably greater than five, how does our	8 8	overhauled, it may not be in the 4,000-hour
9 9 experience compared to I mean, as far as we	9 9	interval.
10 10 know, there are no bolt failures in the hundreds	10 10	
	10 10	
11 11 of other engines that are in use. Do you agree	11 11	
11 11 of other engines that are in use. Do you agree 12 12 with that?	11 11 12 12	4,000 hours, right?  A Generally speaking, that's the overhaul
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		Page 130			Page 132
1	1	MR. MARIANI: I object to your comments on	1	1	BY MS. RATHKE:
2	2	the side, which is uncalled for.	2	2	Q Okay. And you know that
3	3	You may now answer the question.	3	3	A The preload could be related you know, the
4	4	THE DEPONENT: Could you repeat it? You	4	4	small changes in preload could be related to
5	5	kind of broke up at the end of your question.	5	5	exactly, you know, air in the torque wrenches,
6	6	BY MS. RATHKE:	6	6	okay. Temperature the exact temperature at
7	7	Q Yes.	7	7	which the torque is applied when it comes down
8	8	A I'm sorry.	8	8	at 400 degrees.
9	9	-	9	9	All those things are going to accumulate
10	10		10	10	into an air band, a statistical band that is
11	11		11	11	going to contribute to the failure rate. And if
12	12	least that population of aircraft that have been	12	12	we're right on the edge, which I suspect we are,
13	13		13	13	I think that's why you're seeing these failures,
14	14		14	14	a very rare occurrence.
15	15		15	15	Q All right. You are aware that failures of
16	16		16	16	diffuser bolts have to be reported to the FAA's
17	17	A Well, I disagree with that, say that, okay,	17	17	database, correct?
	18		18	18	MR. MARIANI: Objection. Calls for a legal
19	19	they're aware of four engines that have had	19	19	conclusion.
20	20	diffuser bolt failures.	20	20	You can answer.
21	21	Well, Pratt & Whitney I'm aware of three	21	21	BY MS. RATHKE:
22	22	failures from Pratt & Whitney. So I would say	22	22	Q I take it you're not aware of that?
23	23	it's fairly equal in terms of that.	23	23	MR. MARIANI: Objection.
24	24	Q Yeah, I'm not trying to distribute blame. I	24	24	THE DEPONENT: I've seen some people
25			25		
		Page 131			Page 133
1	1	think you're looking at the wrong focus of my	1		
2		unlik you're looking at the wrong locus of my	1	1	discuss it, and I'm not sure what the answer to
1	2	question.	2	1 2	discuss it, and I'm not sure what the answer to that is so I would defer to Mr. Cheyne.
3	2			2	·
3 4		question.	2 3	2	that is so I would defer to Mr. Cheyne.
4	3	question. I'm just asking why there aren't more	2 3 4	2 3 4	that is so I would defer to Mr. Cheyne. BY MS. RATHKE:
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5	3 4 5	question.  I'm just asking why there aren't more broken diffuser bolts in the field, given that we know that Dallas Airmotive itself has	2 3 4 5	2 3 4 5 6	that is so I would defer to Mr. Cheyne. BY MS. RATHKE: Q Is he a lawyer? A No. The expert.
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1 1 on the FAA website, and that's about as much of	1 1	didn't Pratt & Whitney do something about it?
2 2 the ability that I have to do. I know the	2 2	And as of May, they did.
3 3 Dallas Airmotive doesn't have any information	3 3	BY MS. RATHKE:
4 4 about that engine either.	4 4	Q So you're going to say the reason that you've
5 5 Q Okay. So your words are it's likely that many	5 5	known about this issue since at least the date
6 6 engines are right on the edge, correct? That	6 6	of your report in February, correct?
7 7 was your testimony?	7 7	A Correct.
8 8 A Yes.	8 8	Q By extension, Dallas Airmotive has understood
9 9 Q Right on the edge of what? Like, how many	9 9	
10 10 diffuser bolt failures do you feel like we're	10 10	
11 11 right on the edge of?	11 1	1 A Yes.
12 12 A What I'm saying is the joint is on the edge, and	12 12	2 Q As of February, when we knew Dallas Airmotive
13 13 it's going to be extremely sensitive to preload.	13 13	knew, that any little thing could cause us to
14 14 And all of these variables, once you stack them	14 14	
15 15 up, air in torque wrenches, temperature at which	15 13	has Dallas Airmotive started replacing diffuser
16 16 you complete the torquing, the speed of the	16 10	bolts during overhaul or are they still reusing
17 17 torquing, the joint is sensitive to all of those	17 1	
18 18 things, so you're going to see in some cases	18 18	MR. MARIANI: Objection. You misstated his
19 19 you're going to get some that are maybe torqued	19 19	
20 20 right on the edge.	20 20	
21 21 Let's say we had it torqued to	21 2	THE DEPONENT: You did misstate my
22 22 30 inch-pounds and the air of the wrench was a	22 2	
23 23 little bit the precision of the wrench is a	23 23	
24 24 little bit different. This could be DAI. This	24 24	
25	25	
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1 1 could be Pratt & Whitney. You're getting into	1 1	but I believe they've been replacing the bolts
2 2 that range where you're getting barely enough	2 2	since prior to my report being issued.
3 3 preload.	3 3	BY MS. RATHKE:
4 4 So now this is what I suspect, is you're	4 4	Q What's the source of your information?
5 5 getting into that range where there's just		A Dallas Airmotive.
6 6 barely enough preload and any little thing, any	6 6	Q And is it your understanding that Dallas
7 7 little change, if the preload is just slightly	7 7	
8 8 too low, then you're going to start getting a	8 8	
9 9 fatigue crack. Nonetheless, I can tell you	9 9	levels are getting higher to notify them of this
10 10 this, that there's no evidence that the bolts	10 10	issue?
11 11 failed due to overtorquing, especially due to	11 1	3
12 12 your expert's theories.	12 12	•
13 13 Q Well, if "any little thing" can mean that you're	13 13	
14 14 going to start getting a preload, I mean,	14 14	
15 15 listen. My client is just an aircraft owner.	15 13	
16 16 They don't have anything to do with this	16 16	
17 17 industry other than that. But why isn't Dallas	17 1	Ç C
18 18 Airmotive, therefore, sounding the alarm?	18 18	
19 19 MR. MARIANI: I'm going to object to the	19 19	
20 20 question as compound and also including some	20 20	
21 21 gratuitous comments.	21 2	•
22 22 You can answer if you understand what the	22 22	
· · · · · · · · · · · · · · · · · · ·		
23 23 question is.		BY MS. RATHKE:
· · · · · · · · · · · · · · · · · · ·	23 23 24 24 25	

35 (Pages 134 - 137)

Should it and that it has contributed to the problem by performing overhauls and reusing the should not have reused some bolts that we should not have reused some bolts the wint special problem because we believe it's a safety issue.  10 10 10 Do you think there's any obligation that the that you just asked	2 A Yes. 3 Q To your understanding, does Dallas Airmotive owe 4 any duty at all to those customers of Dallas 5 Airmotive to say, We have recently learned that 6 we should not have reused some bolts that we put 7 into your engine. We wanted to notify you of 8 this problem because we believe it's a safety 9 issue. 10 Do you think there's any obligation that 11 Dallas Airmotive has to notify people that they 12 have a safety issue? 13 MR. MARIANI: I'm going to object. It's 14 the third time you asked this. You're asking 15 for legal conclusions from a lay witness, and 16 this also goes beyond the scope of what this 17 witness 18 MS. RATHKE: He's not a lay witness. He's 19 your expert.			Page 138			Page 1
3 3 Problem exists. 4 4 Should it and that it has contributed to 5 5 the problem by performing overhauls and reusing 6 6 bolts. Should under these circumstances, 7 7 should Dallas Airmotive be notifying operators 8 8 that they need to come in and get their diffuser 9 9 bolts replaced? 10 10 MR. MARIANI: Objection. Same question 11 11 that you just asked. Calls for a legal 12 12 conclusion again, because it's the same 13 13 question. 14 14 You can answer it a second time. 15 15 THE DEPONENT: No, I don't believe they 16 16 need to because Pratt & Whitney issued a service 17 17 bulletin in 2018 recommending the bolts to be 18 18 replaced. 19 19 BY MS. RATHKE: 20 20 Q So you think that eliminates all danger from the 2 12 ond that it has contributed to the any duty at all to those customers of Dallas 4 4 any duty at all to those customers of Dallas 5 5 Airmotive to say, We have recently learned the 6 6 we should not have reused some bolts that we 7 7 into your engine. We wanted to notify you of 8 8 this problem because we believe it's a safety 9 9 issue. 10 10 Do you think there's any obligation that 11 11 Dallas Airmotive has to notify people that the 12 12 have a safety issue? 13 13 MR. MARIANI: I'm going to object. It's 14 14 the third time you asked this. You're asking 15 15 for legal conclusions from a lay witness, and 16 16 this also goes beyond the scope of what this 17 17 witness 18 18 MS. RATHKE: He's not a lay witness. He 19 19 BY MS. RATHKE: 20 20 Q So you think that eliminates all danger from the 20 20 MR. MARIANI: This goes beyond the scope of the	3 Q To your understanding, does Dallas Airmotive owe 4 any duty at all to those customers of Dallas 5 Airmotive to say, We have recently learned that 6 we should not have reused some bolts that we put 7 into your engine. We wanted to notify you of 8 this problem because we believe it's a safety 9 issue. 10 Do you think there's any obligation that 11 Dallas Airmotive has to notify people that they 12 have a safety issue? 13 MR. MARIANI: I'm going to object. It's 14 the third time you asked this. You're asking 15 for legal conclusions from a lay witness, and 16 this also goes beyond the scope of what this 17 witness 18 MS. RATHKE: He's not a lay witness. He's 19 your expert.	2	1	isn't doing it. At least they're not to my	1	1	own customers, correct?
4 4 Should it and that it has contributed to 5 5 the problem by performing overhauls and reusing 6 6 bolts. Should under these circumstances, 7 7 should Dallas Airmotive be notifying operators 8 8 that they need to come in and get their diffuser 9 9 bolts replaced? 9 9 issue. 10 10 MR. MARIANI: Objection. Same question 11 11 that you just asked. Calls for a legal 11 11 Dallas Airmotive has to notify people that the 12 12 conclusion again, because it's the same 13 13 question. 14 14 You can answer it a second time. 15 15 THE DEPONENT: No, I don't believe they 16 16 need to because Pratt & Whitney issued a service 17 17 bulletin in 2018 recommending the bolts to be 18 18 replaced. 19 19 BY MS. RATHKE: 20 20 Q So you think that eliminates all danger from the 2	any duty at all to those customers of Dallas Airmotive to say, We have recently learned that we should not have reused some bolts that we put into your engine. We wanted to notify you of this problem because we believe it's a safety issue.  Do you think there's any obligation that Dallas Airmotive has to notify people that they have a safety issue?  MR. MARIANI: I'm going to object. It's the third time you asked this. You're asking for legal conclusions from a lay witness, and this also goes beyond the scope of what this witness  MS. RATHKE: He's not a lay witness. He's your expert.	_	2	knowledge. Dallas Airmotive knows that this	2	2	A Yes.
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21 21 field if, going forward in May, we start 21 21 what he's designated for as an expert. So you		20	20	Q So you think that eliminates all danger from the	20	20	MR. MARIANI: This goes beyond the scope of
	21 what he's designated for as an expert. So you	21	21	field if, going forward in May, we start	21	21	what he's designated for as an expert. So you
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24 24 not an issue. We can just wait until the next 24 24 expert on this case.		24	24	not an issue. We can just wait until the next	24	24	expert on this case.
25	24 expert on this case.	25			25		
Page 139 Pr	24 expert on this case.			Page 139			Page 1
1 1 overhaul. 1 1 MS. RATHKE: I'm not asking as a legal	24 expert on this case.  Page 14	1	1	overhaul.	1	1	MS. RATHKE: I'm not asking as a legal
2 2 MR. MARIANI: Objection. Incomplete 2 2 matter.	Page 14	2	2		2	2	
3 3 RV MS RATHKE	Page 14  1 MS. RATHKE: I'm not asking as a legal 2 matter.	3	3	hypothetical.	3	3	
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4 4 Should it and that it has contributed to 5 5 the problem by performing overhauls and reusing 6 6 bolts. Should under these circumstances, 7 7 should Dallas Airmotive be notifying operators 8 8 that they need to come in and get their diffuser 9 9 bolts replaced? 9 10 MR. MARIANI: Objection. Same question 1 11 that you just asked. Calls for a legal 2 12 conclusion again, because it's the same 3 13 question. 4 14 You can answer it a second time. 5 15 THE DEPONENT: No, I don't believe they 6 16 need to because Pratt & Whitney issued a service 7 17 bulletin in 2018 recommending the bolts to be 8 18 replaced. 9 19 BY MS. RATHKE: 9 20 Q So you think that eliminates all danger from the 9 4 4 any duty at all to those customers of Dallas Airmotive to say, We have recently learned the 9 4 we should not have reused some bolts that we should not have reused some bolts that we into your engine. We wanted to notify you of 9 we should not have reused some bolts that we into your engine. We wanted to notify you of 10 10 Do you think there's any obligation that 11 Dallas Airmotive has to notify people that the 12 12 have a safety issue? 13 13 MR. MARIANI: I'm going to object. It's 14 the third time you asked this. You're asking 15 for legal conclusions from a lay witness, and 16 16 this also goes beyond the scope of what this 17 17 witness 18 18 MS. RATHKE: He's not a lay witness. He your expert. 19 19 WIN. MARIANI: This goes beyond the scope of what the scope of what this you're expert.	any duty at all to those customers of Dallas Airmotive to say, We have recently learned that we should not have reused some bolts that we put into your engine. We wanted to notify you of this problem because we believe it's a safety issue.  Do you think there's any obligation that Dallas Airmotive has to notify people that they have a safety issue?  MR. MARIANI: I'm going to object. It's the third time you asked this. You're asking for legal conclusions from a lay witness, and this also goes beyond the scope of what this witness  MS. RATHKE: He's not a lay witness. He's your expert.	2		_	2	2	
3 3 Problem exists. 4 4 Should it and that it has contributed to 5 5 the problem by performing overhauls and reusing 6 6 bolts. Should under these circumstances, 7 7 should Dallas Airmotive be notifying operators 8 8 that they need to come in and get their diffuser 9 9 bolts replaced? 9 10 MR. MARIANI: Objection. Same question 1 11 that you just asked. Calls for a legal 2 12 conclusion again, because it's the same 3 13 question. 4 14 You can answer it a second time. 5 15 THE DEPONENT: No, I don't believe they 6 16 need to because Pratt & Whitney issued a service 7 17 bulletin in 2018 recommending the bolts to be 8 18 replaced. 9 19 BY MS. RATHKE: 9 Q So you think that eliminates all danger from the 9 MR. MARIANI: This goes beyond the score	any duty at all to those customers of Dallas Airmotive to say, We have recently learned that we should not have reused some bolts that we put into your engine. We wanted to notify you of this problem because we believe it's a safety issue.  Do you think there's any obligation that Dallas Airmotive has to notify people that they have a safety issue?  MR. MARIANI: I'm going to object. It's the third time you asked this. You're asking for legal conclusions from a lay witness, and this also goes beyond the scope of what this witness  MS. RATHKE: He's not a lay witness. He's your expert.	$^{\circ}$					

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	Page 142			Page 144
1 1	within Rule 26.	1	1	A No, that's what your experts explicitly say.
2 2	MS. RATHKE: Then you just object.	2		They say we overtorqued the bolts and we cracked
3 3	MR. MARIANI: No, no. I have other bases	3	3	them. Your experts explicitly say that.
4 4	to go beyond it. I can direct him not to answer	4	4	Q Okay. I'm not asking you to testify for my
5 5	when you're abusing your rights as a lawyer.	5	5	experts. Do you understand that?
6 6	MS. RATHKE: Then do that. But your	6	6	A I clearly understand it. I'm just saying you
7 7	speaking objections are inappropriate.	7	7	asked a question. I can't answer that question
8 8	MR. MARIANI: Well, I thought you would	8	8	directly.
9 9	want to know why I'm directing him not to answer	9	9	Q When would you expect initiation cracks to
10 10	a question.	10	10	occur, after how many hours in service?
11 11	MS. RATHKE: No. I believe that your	11	11	A I don't know.
12 12	speaking objections are inappropriate.	12	12	Q Based on your theory?
13 13	, 1	13	13	MR. MARIANI: Objection. Incomplete
14 14	Ţ Ţ		14	hypothetical.
15 15	, , , , , , , , , , , , , , , , , , ,		15	You can answer.
16 16			16	
17 17			17	
18 18			18	
19 19	· · · · · · · · · · · · · · · · · · ·		19	thousands of hours of service?
20 20	,		20	MR. MARIANI: Same objection.
21 21	•	21		THE DEPONENT: I don't know.
22 22	3		22	
23 23			23	
24 24 25	MR. MARIANI: Incomplete hypothetical.	24 25	24	of diffuser bolts used in Pratt & Whitney 530A
23		23		
	Page 142			Daga 145
1 1	Page 143 You can answer.	1	1	Page 145 engines would you expect to fail under your
1 1 2 2	You can answer.	1 2	1 2	engines would you expect to fail under your
1 1 2 2 3 3		2	2	engines would you expect to fail under your theory?
2 2	You can answer. THE DEPONENT: Yes. BY MS. RATHKE:		2	engines would you expect to fail under your theory?  A I don't know. I don't have enough information,
2 2 3 3	You can answer.  THE DEPONENT: Yes.  BY MS. RATHKE:  Q Why would you feel safe doing that, considering	2 3	2	engines would you expect to fail under your theory?
2 2 3 3 4 4	You can answer. THE DEPONENT: Yes. BY MS. RATHKE:	2 3 4	2 3 4 5	engines would you expect to fail under your theory?  A I don't know. I don't have enough information, and I don't have enough information about the
2 2 3 3 4 4 5 5	You can answer.  THE DEPONENT: Yes.  BY MS. RATHKE:  Q Why would you feel safe doing that, considering your testimony about the systematic issues with	2 3 4 5	2 3 4 5	engines would you expect to fail under your theory?  A I don't know. I don't have enough information, and I don't have enough information about the joint to make that conclusion.
2 2 3 3 4 4 5 5 6 6	You can answer. THE DEPONENT: Yes. BY MS. RATHKE: Q Why would you feel safe doing that, considering your testimony about the systematic issues with the diffuser bolts?	2 3 4 5 6	2 3 4 5 6 7	engines would you expect to fail under your theory?  A I don't know. I don't have enough information, and I don't have enough information about the joint to make that conclusion.  Q Is there any pattern as to which diffuser bolts
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1 1 next one will go and it'll follow a pattern.	1 1 these five bolts in each of these five engines,
2 2 Q And is that because if you lose the joining	2 2 correct?
3 3 force of one bolt, that puts more force on its	3 3 A Correct.
4 4 neighbors?	4 4 Q How many bolts do you have per engine?
5 5 A Yes. The load is shed to the neighboring bolts.	5 5 A For all of them but DAO169, I have all 22.
6 6 Q Yeah.	6 6 Q Okay. And how many do you have for 169?
7 7 Okay. Referring back to Exhibit 91, which	7 7 A I don't recall I think I have them all, but I
8 8 is your report. Let's go to page 15 of the	8 8 just don't recall off the top of my head.
9 9 report, page 16 of the PDF, Section 8.0.	9 9 Q Okay. And in your data file, is there raw data
10 10 A Okay.	10 10 indicating what bolt had each breakaway torque
11 11 Q In the middle of the first paragraph in	11 11 value? In other words, if I wanted to know the
12 12 Section 8.0, you say: "Dallas Airmotive	12 12 breakaway torque value for each particular
13 13 provided data regarding the breakaway torque	13 13 individual bolt, could I find that in your file?
14 14 values measured when these bolts were removed	14 14 A Yes.
15 15 from the diffuser assemblies."	15 15 Q Okay. And who did you receive that torque
16 16 Do you see that?	16 16 breakaway torque information from?
17 17 A Yes.	17 17 A The breakaway torque information was sent to me
18 18 Q Do you have information as to how these	18 18 with the bolts from Dallas Airmotive.
19 19 breakaway torque values were measured by Dallas	19 19 Q And by whom specifically at Dallas Airmotive?
20 20 Airmotive before the components came to you?	20 20 A I don't recall who sent whose name was on the
21 21 A Yes. As I stated in my report, they measure	21 21 envelope. It was Ian Cheyne or John Fallor, I
22 22 them in a loosening direction.	22 22 assume.
23 23 Q Do you regard Dallas Airmotive's breakaway	23 23 Q And what is your understanding as to why the
24 24 torque data as accurate?	24 24 reinstalled bolts have higher breakaway torque
25 torque data as accurate.	25
Page 147	Page 14
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		Page 150			Dogg 16
1	1	Page 150 bolt and the nut. I can't tell you exactly	1	1	Page 15
	2	what's going on. There's too many variables to	2		Q What organization calibrates these?
1	3	consider.	3		
	4	But that's why people tell you that's	4	4	micrometer?
5	5	why most joints that are considered critical,	5	5	Q Yes.
6	6	manufacturers tell you to replace the bolts	6	6	A It was calibrated by Mitutoyo.
7	7	because you avoid problems like this.	7		
8	8	Q So if there are other applications within these	8	8	A It's brand-new.
9	9	aircraft or other aircraft where Dallas	9	9	Q As of when?
10 1	10	Airmotive is reusing rather than replacing	10	10	A As of five days before the testing began. The
11 1	11	bolts, is that problematic for you?	11	11	certificate of calibration is in my file. It's
12 1	12	MR. MARIANI: Objection to the form.	12	12	the same one Mr. Meyers used.
13 1	13	Vague.	13	13	Q The same what?
14 1	14	You can answer.	14	14	A Same micrometer.
15 1	15	THE DEPONENT: One moment.	15	15	Q Okay. And in your eight test parameters, ye
16 1	16	The answer to that is it's not problematic	16	16	
17 1		$\varepsilon$ , $\varepsilon$	17	17	
18 1	18		18	18	•
19 1	19	<b>3</b> E	19	19	9
20 2		1 0		20	
21 2			l .	21	1
22 2		- 1		22	E
23 2		• • •			
24 2	24	lights turn back on.		24	develop and where those cracks develop.
25			25		
		Page 151			Page 15
1 1		Q So you used the phrase, and it went by me so	1	_	Q And in doing this, is it your intention as
2 2		quickly I didn't write it down, but if something	2		closely as possible within the equipment that
3 3		is a critical joint or critical	3	3	you've got to replicate as closely as possible?
		A If you look at data, and I can tell you from	4		A I apologize.
5 5		anecdotal experience as well, if you look at	5		<ul><li>Q No, go ahead and turn on your lights.</li><li>A I'll do it in the dark.</li></ul>
7 3		literature, you know, engineering literature, you'll see that the recommendation is	7		
8 8		engineering recommendations are typically to	l .	8	testing in these micrometer tests to
9 9		replace bolts that are used in critical	9		replicate as closely as possible the operating
10 1		locations upon reassembly.		10	
1		Q And what is a critical	l .	11	
		A Well, the definition of critical, it depends on	l .	12	_
13 1		what the manufacturer deems critical or not.		13	, , , , , , , , , , , , , , , , , , , ,
14 1		Apparently, Pratt & Whitney now deems this		14	
15 1		critical because they're requesting replacement	l .	15	
16 1		bolts now.	l .	16	3
		Q And have you had a conversation with anybody at	l .	17	
18 1		Pratt & Whitney about that?	l .	18	•
		A No.		19	~
1		Q Okay. Let's go to page 17 of Exhibit 91, so	l .	20	
21 2		Figure 15. Talk a little bit about your testing		21	
22 2		now.		22	<u>*</u>
23 2		All right. Figure 15 on page 17 of		23	1
24 2	24	Exhibit 91 shows your test fixtures; fair?	24	24	
25			25		-

D 154	D. 150
Page 154  1 1 just showing the purpose of this photograph	Page 156 1 1 six threads protruding off the end of it, as a
2 2 was just to show the two different fixtures.	2 2 functional matter you are testing the amount of
3 3 But, yes, it's generally showing how the	3 3 stretch in the portion of the bolts that is
4 4 measurements were taken on loaded bolts.	4 4 between the nut and the bottom of the bolt head?
5 5 Q And how these also characterize fairly how	5 5 A Yes. I think yes.
6 6 the bolts were placed in the test equipment?	6 6 Q And do any of your tests replicate what torque
7 7 A How the bolt was fixtured in the test slug, yes.	7 7 value is needed to produce a failure when a bolt
8 8 Q Yes. Go to page 22 of Exhibit 91.	8 8 is subject to engine heat and vibration as it is
9 9 A Yes.	9 9 in operation?
10 10 Q You see Figure 20?	10 10 A No.
11 11 A Sorry. 20. Figure 20? Yes.	11 11 Q And your testing shows the overtorque required
12 12 Q Yeah, Figure 20.	12 12 to produce an instantaneous overload of a bolt
13 13 A Yes.	13 13 by applying a torque that exceeds the strength
14 14 Q The lower picture in Figure 20, there's a	14 14 of the bolt; is that correct?
15 15 picture of a test L used bolt. Is that one of	15 15 MR. MARIANI: Objection to the form.
16 16 the bolts that you tested with the micrometer?	16 16 You can answer.
17 17 A Yes.	17 17 THE DEPONENT: I don't agree with the term
18 18 Q Okay. And	18 18 "instantaneous overload."
19 19 A Obviously, I didn't measure it when it was	19 19 BY MS. RATHKE:
20 20 broken because it bears no there is no valid	20 20 Q Is there a better term that I should be using?
21 21 number because it's broken, but that bolt was	21 21 I think you see what I'm trying to convey.
22 22 measured with a micrometer before it was tested.	22 22 MR. MARIANI: Objection of the form.
23 23 Q And the way that the nut is placed on the test L	23 23 You can answer if you understand the
24 24 used bolt depicted in Figure 20 in Exhibit 91,	24 24 question.
25	25
Page 155	Page 157
Page 155  1 1 is this how the nut was placed when you were	Page 157 1 1 THE DEPONENT: Can you just repeat the
_	_
1 1 is this how the nut was placed when you were	1 1 THE DEPONENT: Can you just repeat the
1 1 is this how the nut was placed when you were 2 2 doing your stretch testing? 3 3 A I don't know what you mean. 4 4 Q Where the nut is sitting on the is where the	1 1 THE DEPONENT: Can you just repeat the 2 2 question?
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40 (Pages 154 - 157)

	Page 158			Page 160
1	Q Why is friction underneath the head of the bolt	1	1	lubricant?
2	improper?	2	2	A Well, that's really easy. I drilled the hole
3	A Because if you read any book on bolted joints,	3	3	the right size. Mr. Meyers' clearance hole was
4	it will tell you to avoid exactly the situation	4	4	undersized. I wasn't provided his fixture to
5	that exists on Mr. Meyers' bolt.	5	5	measure it, but it's clear on his test fixture
6	Q Why?	6	6	that there is galling in the radius and on the
7	A Because it creates excess friction.	7	7	shank of the bolt. So that's telling me that
8	Q I think we read, though, in Dallas Airmotive's	8	8	the clearance hole in his test fixture was too
9	operating checklist that in operation you're not	9	9	small.
10	supposed to put any sort of lubricant underneath	10	10	Q Do you indicate in your report that his
11	the head of the bolt. Do you recall that?	11	11	clearance hole is too small?
12	A That's unrelated to what I'm speaking of. But,	12	12	A I think I do.
13	yes, I do.	13	13	Q Why don't you go ahead and let me know orient
14	Q In actual operation, there will be friction	14	14	me to where you indicate that.
15	underneath the bolts with whatever surface it is	15	15	A Right there on page 29 of my report, paragraph
16	that the bolt is contacting, correct?	16	16	underneath Figure 23: "Fusion Engineering
17	A There won't be that much.	17	17	observed a significant amount of smearing and
18	Q Why not?	18	18	galling beneath the head. Figure 24 shows that
19	A There's no evidence of that same type of	19	19	the smearing extended into the radius between
20	damage it's as simple as this. His test data	20	20	the flange and shank of the bolt, suggesting
21	is invalid because of the amount of friction	21	21	that interference was occurring between the
22	that he generated under there, the torque value	22	22	radius and the bolt hole in the test fixture,
23	that he required to fracture.	23	23	indicating that a high friction was present."
24	If you look up the nut factor that we	24	24	Q Where does it say that the bolt hole was too
		25		
	Page 159			Page 161
1		1		small?
				A Well, I'm saying the exact same thing with
				"interference." It's synonymous.
				Q Does any of your testing show that a used bolt
				develops cracks at a lower torque value than the
				new bolt?
				A I think they were all within the same range. I
				would have to double-check my data, but as I
				recall they were all relatively close to each
	You can answer.			THE DEPONENT: Can we take a quick
	•			
				3
17	scrape off.		17	C
	However, if you look at the bottom of my		18	
18	1 1, 111 11 2 22	19	19	BY MS. RATHKE:
19	bolts, you'll see some evidence of some galling,		~ -	
19 20	which will suggest there wasn't really any	20	20	, ,
19 20 21	which will suggest there wasn't really any lubricant present there.	20 21	21	told me, that as far as how much torque it takes
19 20 21 22	which will suggest there wasn't really any lubricant present there. BY MS. RATHKE:	20 21 22	21 22	told me, that as far as how much torque it takes to actually crack a bolt, your testing shows
19 20 21	which will suggest there wasn't really any lubricant present there. BY MS. RATHKE:	20 21 22 23	21	told me, that as far as how much torque it takes to actually crack a bolt, your testing shows that the performance of new bolts and the
	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	1 Q Why is friction underneath the head of the bolt improper? 3 A Because if you read any book on bolted joints, it will tell you to avoid exactly the situation that exists on Mr. Meyers' bolt. 6 Q Why? 7 A Because it creates excess friction. 8 Q I think we read, though, in Dallas Airmotive's operating checklist that in operation you're not supposed to put any sort of lubricant underneath the head of the bolt. Do you recall that? 12 A That's unrelated to what I'm speaking of. But, yes, I do. 14 Q In actual operation, there will be friction underneath the bolts with whatever surface it is that the bolt is contacting, correct? 17 A There won't be that much. 18 Q Why not? 19 A There's no evidence of that same type of damage it's as simple as this. His test data is invalid because of the amount of friction that he generated under there, the torque value that he required to fracture. 14 If you look up the nut factor that we  Page 159 1 calculated, it's more than twice what is indicated in any reputable piece of literature. 3 That tells you there's an issue right there. 4 Q For your testing, did you put a lubricant under the head of the bolt? 5 A Not intentionally ever. 7 Q Okay. But my question is: Did you put lubrication under the head of the bolt?  MR. MARIANI: Objection. Asked and answered.  You can answer.  THE DEPONENT: Unintentionally. Like I said, sometimes just in any assembly situation, you may get a small amount of lubricant under the head of the bolt due to the fact that you're	1 Q Why is friction underneath the head of the bolt improper? 2 A Because if you read any book on bolted joints, it will tell you to avoid exactly the situation 4 5 that exists on Mr. Meyers' bolt. 5 6 Q Why? 7 A Because it creates excess friction. 7 8 Q I think we read, though, in Dallas Airmotive's operating checklist that in operation you're not supposed to put any sort of lubricant underneath 10 the head of the bolt. Do you recall that? 11 2 A That's unrelated to what I'm speaking of. But, yes, I do. 13 4 Q In actual operation, there will be friction 14 15 underneath the bolts with whatever surface it is 15 16 that the bolt is contacting, correct? 16 17 A There won't be that much. 17 18 Q Why not? 18 19 A There's no evidence of that same type of 19 20 damage it's as simple as this. His test data 20 21 is invalid because of the amount of friction 21 22 that he generated under there, the torque value 22 23 that he required to fracture. 23 24 If you look up the nut factor that we 24 25  Page 159 1 calculated, it's more than twice what is 10 2 indicated in any reputable piece of literature. 23 3 That tells you there's an issue right there. 24 4 Q For your testing, did you put a lubricant under 24 5 the head of the bolt? 5 6 A Not intentionally ever. 6 7 Q Okay. But my question is: Did you put 10 8 lubrication under the head of the bolt? 8 9 MR. MARIANI: Objection. Asked and 29 10 answered. 10 11 You can answer. 11 12 THE DEPONENT: Unintentionally. Like I 3 13 said, sometimes just in any assembly situation, 13 14 you may get a small amount of lubricant under 14 15 the head of the bolt due to the fact that you're 15	1 Q Why is friction underneath the head of the bolt improper? 2 2 2 3 A Because if you read any book on bolted joints, it will tell you to avoid exactly the situation 5 that exists on Mr. Meyers' bolt. 5 5 5 6 Q Why? 6 6 6 6 7 A Because it creates excess friction. 7 7 7 8 Q I think we read, though, in Dallas Airmotive's 9 operating checklist that in operation you're not 10 supposed to put any sort of lubricant underneath 11 the head of the bolt. Do you recall that? 11 the head of the bolt. Do you recall that? 11 11 11 12 12 12 12 13 yes, I do. 13 13 13 13 13 13 14 Q In actual operation, there will be friction 14 14 14 14 14 14 14 14 14 14 14 14 14

Page 162	Page 16
1 1 A As I said, that's my recollection. I would have	1 1 we scaled it to high magnification images that
2 2 to check my data to confirm that.	2 2 we took of the bolt before and after we
3 3 Q As far as bolt stretching is concerned, is time	3 3 stretched it significantly, permanently
4 4 a factor at a given torque level for how much	4 4 stretched it. Okay. And then what we did on
5 5 bolt stretch that will occur? In other words,	5 5 top of that what we saw was essentially no
6 6 like, having it torqued for a year, is that	6 6 change in the thread form, which means no stress
7 7 going to produce a different result in terms of	7 7 or strain or pardon me, no permanent strain
8 8 stretch than doing it for a second?	8 8 was developing in the thread form, which goes
9 9 A You're going to get a small amount of relaxation	9 9 back to why the cracks are occurring only at the
10 10 over time.	10 10 shank in the first lead-in thread. Okay? That
11 11 Q Is that quantified anywhere?	11 11 data supports that.
12 12 A I think it depends on a lot of factors, but it's	12 12 Further to that, what we did is we took the
13 13 going to be a small amount.	13 13 entire length of the bolt. And if you go into
14 14 Q Page 19 of your report, Exhibit 91. The last	14 14 my file, you'll see where we made precision
15 15 paragraph says in the middle it says that you	15 15 measurements of each section of the bolt where
16 16 indicate that stretch deformation occurred	16 16 they were lined up next to each other and
17 17 predominantly to the in the shank portion of	17 17 they're comparing the lengths and the change of
18 18 the bolts.	18 18 the head, the change of the shank and the change
19 19 It's not clear to me how you determined	19 19 in length of the threads.
20 20 that. So can you tell me how you determined	20 20 So this is all based on a paper that we
21 21 that and the extent to which these figures on	21 21 were that your experts supplied where
22 22 the next page are relevant?	22 22 overtorque was being detected by finding strain
23 23 A Are you referring to okay. Well, you have to	23 23 in the threads. And this evidence shows there's
24 24 look at the rest of my file. But what we did	24 24 no major permanent strain being developed in the
25	25
Page 163	Page 16
1 1 here was we developed we got the thread form	1 1 threads.
2 2 from the SAE or ANSI standard. We found the	2 2 Q You indicated that for the new bolts that you
3 3 limits of that thread form. We then scaled the	3 3 used, you got them from Dallas Airmotive,
3 3 limits of that thread form. We then scaled the 4 4 thread form to the bolt itself to calculate how	3 3 used, you got them from Dallas Airmotive, 4 4 correct?
4 4 thread form to the bolt itself to calculate how	4 4 correct?
4 4 thread form to the bolt itself to calculate how 5 5 much deformation was occurring in the threads.	4 4 correct? 5 5 A Correct.
<ul> <li>4 4 thread form to the bolt itself to calculate how</li> <li>5 5 much deformation was occurring in the threads.</li> <li>6 6 And then for this particular test what we did</li> </ul>	<ul> <li>4 4 correct?</li> <li>5 5 A Correct.</li> <li>6 6 Q And are these the same type the same bolts</li> </ul>
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42 (Pages 162 - 165)

	Page 166			Page 168
1 1 BY	MS. RATHKE:	1	1	MR. MARIANI: I'm only able to see two
	Chapter 15 of the Bickford book is called		2	pages on Exhibit 94 when I'm opening it in the
	Fatigue Failure. Are you familiar with that	3	3	Veritext. The third page is blank. It looks
	chapter?	4	4	like there's three pages total and the third
	Yes.	5	5	page is blank.
	All right. I haven't replicated the whole	6	6	MS. RATHKE: Mine has all three pages. How
1	chapter because it's a lot of pages and I'm		7	about yours, Mr. Jones?
	working from home, but I've got the first few	8	8	THE DEPONENT: I have it.
	pages of that chapter. Are you with me?	9	9	MS. RATHKE: Okay. Well, Ray, I'm not
_	Yeah. Can you give me one second so I can open	10	10	sure. Maybe Marissa can email it to you. But
	it in something that I can view it in? One	11	11	I'm just going to carry on.
	moment.	12	12	MR. MARIANI: Okay. Hold on a second. I
13 13 O	Yes. Of course.	13	13	need to see your exhibits you're using as well,
_	Okay. I'm ready when you are.	14	14	not just you. So you need to hold on. I'm
	Okay. Let's see what we all right. Let's	15	15	going to try to go back out and load it again.
	just start on the first page of Exhibit 94,	16		It's not showing up.
1	Section 15.1, Fatigue Progress. All right.	17	17	I don't have page 2 anymore but now I have
	Sequence of a fatigue failure.	18	18	page 3. So there's some flaw in the Veritext
19 19	"We learned in Chapter 13 that fatigue will	19	19	software, whatever. But I can see page 3 now.
20 20	be a potential problem only if four essential	20	20	MS. RATHKE: There's a flaw in some part of
	conditions are present: Cyclic tensile loads,	21	21	the process.
22 22	stress levels above a threshold value called the	22	22	BY MS. RATHKE:
23 23	endurance limit, a susceptible material, and an	23	23	Q All right. So 15.1.3 on page 3 of Exhibit 94,
24 24	initial flaw in that material. If these	24	24	are you with me, Mr. Jones?
25		25		
	Page 167			Page 169
1 1 0	conditions are all present, then a natural	1	1	A Yes.
2 2 s	sequence of events can occur and can lead to a	2	2	Q All right. The last paragraph of that section
3 3 f	fatigue failure. These events are called crack	3	3	says: "The most common places to find fatigue
4 4 i	initiation, crack growth, crack propagation, and	4		•
		4	4	cracks and failures in bolts are in the regions
5 5 f	final rupture."	5	4 5	•
5 5 f				cracks and failures in bolts are in the regions
6 6	final rupture."	5	5	cracks and failures in bolts are in the regions of highest stress concentration."
6 6 7 7 s	final rupture." Do you agree with that directionally	5 6	5 6	cracks and failures in bolts are in the regions of highest stress concentration."  Do you agree with that as a general
6 6 7 7 8 8 8 A	final rupture."  Do you agree with that directionally speaking?	5 6 7	5 6 7	cracks and failures in bolts are in the regions of highest stress concentration."  Do you agree with that as a general statement?
6 6 7 7 8 8 8 A 9 9 Q	final rupture."  Do you agree with that directionally speaking?  Generally speaking, yes.	5 6 7 8 9	5 6 7 8	cracks and failures in bolts are in the regions of highest stress concentration."  Do you agree with that as a general statement?  A Yes.  Q And then it says: "These are where the head joins the shank of the bolt, the thread run-out
6 6 7 7 8 8 8 A 9 9 Q 10 10	final rupture."  Do you agree with that directionally speaking?  Generally speaking, yes.  I mean, I understand. Bickford is it fair to	5 6 7 8 9 10	5 6 7 8 9	cracks and failures in bolts are in the regions of highest stress concentration."  Do you agree with that as a general statement?  A Yes.  Q And then it says: "These are where the head
6 6 7 7 8 8 8 A 9 9 Q 10 10 11 11	Final rupture."  Do you agree with that directionally speaking?  Generally speaking, yes.  I mean, I understand. Bickford is it fair to characterize Bickford as an academic resource	5 6 7 8 9 10 11 12	5 6 7 8 9 10 11 12	cracks and failures in bolts are in the regions of highest stress concentration."  Do you agree with that as a general statement?  A Yes.  Q And then it says: "These are where the head joins the shank of the bolt, the thread run-out point, the first thread or two of engagement in the nut, and any place where there is a change
6 6 7 7 8 8 8 A 9 9 Q 10 10 11 11 12 12 A	Do you agree with that directionally speaking? Generally speaking, yes. I mean, I understand. Bickford is it fair to characterize Bickford as an academic resource for threaded fasteners?	5 6 7 8 9 10 11 12 13	5 6 7 8 9 10 11 12 13	cracks and failures in bolts are in the regions of highest stress concentration."  Do you agree with that as a general statement?  A Yes.  Q And then it says: "These are where the head joins the shank of the bolt, the thread run-out point, the first thread or two of engagement in the nut, and any place where there is a change in diameter of the body or the shank."
6 6 7 7 8 8 8 A 9 9 Q 10 10 11 11 12 12 A 13 13	Do you agree with that directionally speaking? Generally speaking, yes. I mean, I understand. Bickford is it fair to characterize Bickford as an academic resource for threaded fasteners? I consider him an academic and practical	5 6 7 8 9 10 11 12 13	5 6 7 8 9 10 11 12	cracks and failures in bolts are in the regions of highest stress concentration."  Do you agree with that as a general statement?  A Yes.  Q And then it says: "These are where the head joins the shank of the bolt, the thread run-out point, the first thread or two of engagement in the nut, and any place where there is a change in diameter of the body or the shank."  Do you see that?
6 6 7 7 8 8 8 A 9 9 Q 10 10 11 11 12 12 A 13 13 14 14 Q 15 15	Do you agree with that directionally speaking? Generally speaking, yes. I mean, I understand. Bickford is it fair to characterize Bickford as an academic resource for threaded fasteners? I consider him an academic and practical resource for threaded fasteners. Are there instances, however, when real-world application differs from what Bickford	5 6 7 8 9 10 11 12 13 14	5 6 7 8 9 10 11 12 13	cracks and failures in bolts are in the regions of highest stress concentration."  Do you agree with that as a general statement?  A Yes.  Q And then it says: "These are where the head joins the shank of the bolt, the thread run-out point, the first thread or two of engagement in the nut, and any place where there is a change in diameter of the body or the shank."  Do you see that?  A Yes, ma'am.
6 6 7 7 8 8 8 A 9 9 Q 10 10 11 11 12 12 A 13 13 14 14 Q 15 15 16 16	Do you agree with that directionally speaking? Generally speaking, yes. I mean, I understand. Bickford is it fair to characterize Bickford as an academic resource for threaded fasteners? I consider him an academic and practical resource for threaded fasteners. Are there instances, however, when real-world application differs from what Bickford recommends?	5 6 7 8 9 10 11 12 13 14 15 16	5 6 7 8 9 10 11 12 13 14 15 16	cracks and failures in bolts are in the regions of highest stress concentration."  Do you agree with that as a general statement?  A Yes.  Q And then it says: "These are where the head joins the shank of the bolt, the thread run-out point, the first thread or two of engagement in the nut, and any place where there is a change in diameter of the body or the shank."  Do you see that?  A Yes, ma'am.  Q Do you agree with that part of the Bickford
6 6 7 7 8 8 8 A 9 9 Q 10 10 11 11 12 12 A 13 13 14 14 Q 15 15 16 16 17 17 A	Do you agree with that directionally speaking? Generally speaking, yes. I mean, I understand. Bickford is it fair to characterize Bickford as an academic resource for threaded fasteners? I consider him an academic and practical resource for threaded fasteners. Are there instances, however, when real-world application differs from what Bickford recommends? I think Bickford does a good job. I don't know	5 6 7 8 9 10 11 12 13 14 15 16 17	5 6 7 8 9 10 11 12 13 14 15 16 17	cracks and failures in bolts are in the regions of highest stress concentration."  Do you agree with that as a general statement?  A Yes.  Q And then it says: "These are where the head joins the shank of the bolt, the thread run-out point, the first thread or two of engagement in the nut, and any place where there is a change in diameter of the body or the shank."  Do you see that?  A Yes, ma'am.  Q Do you agree with that part of the Bickford exhibit, 94?
6 6 7 7 8 8 8 A 9 9 Q 10 10 11 11 12 12 A 13 13 14 14 Q 15 15 16 16 17 17 A 18 18	Do you agree with that directionally speaking? Generally speaking, yes. I mean, I understand. Bickford is it fair to characterize Bickford as an academic resource for threaded fasteners? I consider him an academic and practical resource for threaded fasteners. Are there instances, however, when real-world application differs from what Bickford recommends? I think Bickford does a good job. I don't know that I agree with that. I think Bickford does a	5 6 7 8 9 10 11 12 13 14 15 16 17 18	5 6 7 8 9 10 11 12 13 14 15 16 17 18	cracks and failures in bolts are in the regions of highest stress concentration."  Do you agree with that as a general statement?  A Yes.  Q And then it says: "These are where the head joins the shank of the bolt, the thread run-out point, the first thread or two of engagement in the nut, and any place where there is a change in diameter of the body or the shank."  Do you see that?  A Yes, ma'am.  Q Do you agree with that part of the Bickford exhibit, 94?  A Yes.
6 6 7 7 8 8 8 A 9 9 Q 10 10 11 11 12 12 A 13 13 14 14 Q 15 15 16 16 17 17 A 18 18	Do you agree with that directionally speaking? Generally speaking, yes. I mean, I understand. Bickford is it fair to characterize Bickford as an academic resource for threaded fasteners? I consider him an academic and practical resource for threaded fasteners. Are there instances, however, when real-world application differs from what Bickford recommends? I think Bickford does a good job. I don't know	5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	5 6 7 8 9 10 11 12 13 14 15 16 17 18	cracks and failures in bolts are in the regions of highest stress concentration."  Do you agree with that as a general statement?  A Yes.  Q And then it says: "These are where the head joins the shank of the bolt, the thread run-out point, the first thread or two of engagement in the nut, and any place where there is a change in diameter of the body or the shank."  Do you see that?  A Yes, ma'am.  Q Do you agree with that part of the Bickford exhibit, 94?  A Yes.  Q And, in fact, the breakages in the field are
6 6 7 7 8 8 8 A 9 9 Q 10 10 11 11 12 12 A 13 13 14 14 Q 15 15 16 16 17 17 A 18 18 19 19	Do you agree with that directionally speaking? Generally speaking, yes. I mean, I understand. Bickford is it fair to characterize Bickford as an academic resource for threaded fasteners? I consider him an academic and practical resource for threaded fasteners. Are there instances, however, when real-world application differs from what Bickford recommends? I think Bickford does a good job. I don't know that I agree with that. I think Bickford does a	5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	cracks and failures in bolts are in the regions of highest stress concentration."  Do you agree with that as a general statement?  A Yes.  Q And then it says: "These are where the head joins the shank of the bolt, the thread run-out point, the first thread or two of engagement in the nut, and any place where there is a change in diameter of the body or the shank."  Do you see that?  A Yes, ma'am.  Q Do you agree with that part of the Bickford exhibit, 94?  A Yes.  Q And, in fact, the breakages in the field are occurring in the first thread or two of
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43 (Pages 166 - 169)

Page 1	70		Page 172
1 1 BY MS. RATHKE:		1	are consistent with what you would expect to
2 2 Q Okay. Page	2	2	actually see.
3 3 A I would say more carefully they're adjacent to	3	3	So I started out by trying to calculate
4 4 the first thread in the nut, but, yes.	4	4	I was going to do a calculation, and then I
5 5 Q Referring back to Exhibit 91, your report.	5	5	looked up some papers on how to do the
6 6 A What's 91?	6	6	calculation. I decided that it would take a lot
7 7 Q Your report.	7	7	of work to do that.
8 8 A Okay.	8	8	So in the alternative, I did the
9 9 Q Page 22, Section 9.0, discussing the testing	9	9	experimental method way to determine what the
10 10 discussion of testing performance by Fusion	10	10	nut factors were, and there was two reasons why
11 11 Engineering. Let's see.	11	11	I wanted to do it.
12 12 The first sentence says: "Examination of	12	12	No. 1, I wanted to know if it changed
13 13 the data collected indicates that the stretch	13	13	between new and old book, old bolts as it
14 14 varies in a linear elastic fashion with the	14	14	clearly indicated in the Bickford book.
15 15 applied torque until approximately 120 to	15	15	Bickford says it in a couple places that you'll
16 16 135 inch-pounds of applied torque."	16	16	see changes when you reuse bolts. So I wanted
17 17 Does this refer back to the data collected	17	17	to determine that.
18 18 in Section 8.0 of your report or does it refer	18	18	And I also wanted to get an idea with the
19 19 to something else?	19	19	Never-Seez, is the nut factor close to what
20 20 A It refers to Figure 16, which is on page 20 of	20	20	published values are. And the data shows that
21 21 my report, and it refers to the linear portion	21	21	it is.
22 22 of the graph that occurs between approximately	22	22	My nut factor is close to published data.
23 23 20 and 135 inch-pounds of applied load, or	23	23	Mr. Meyers is off by a factor of 2.
24 24 applied torque.	24	24	Q Have you ever used the nut factor before in any
25	25		
Page 1	71		Page 173
1 1 Q Okay. And what Figure 16 depicts in graphic	1	1	professional application?
2 2 manner is the results of your testing set forth	2	2	A Yes.
3 3 in Section 8.0 in the previous two pages. Is	3		
4 4 that a fair understanding?	4		A I had a bolted joint case with a wheel off years
5 5 A Yes. I think that's all of the data.	5		ago.
6 6 Q Okay. Got it.	6		Q Any other time?
7 7 All right. Let's talk about the nut	7		A Only in theoretical calculations where I'm using
8 8 factor. What do you use it for and what's its	8		it as the fudge factor, if you will, for a
9 9 significance in your analysis?	9		calculation.
10 10 A Well, in my analysis like I said, originally,			Q Okay. My question indeed is, other than the one
11 11 what I wanted to do, it just seemed to me I		11	time that you describe with the wheel off, have
have a fair bit of experience with bolts, and it		12	-
seemed to me that Mr. Meyers' numbers were		13	
14 14 grossly out of range for what I would expect the			A Oh, yeah, all the time.
15 15 fracture torque to be for a No. 10 fastener. I		15	
mean, he's getting up near 30 inch-pounds. So			A All the time. No, I thought you meant calculate
17 17 the first thing I wanted to do was characterize		17	
10.10		18	
18 18 what is the actual nut factor, and for some	19	19	
19 19 complicity the nut factor in our case is really	1	20	factor. I mean, even in my own personal life
<ul> <li>19 19 complicity the nut factor in our case is really</li> <li>20 20 characterizing all the frictional</li> </ul>	20		
19 19 complicity the nut factor in our case is really 20 20 characterizing all the frictional 21 21 characteristics of what we're measuring here.	21	21	when I'm building something, if I want to
complicity the nut factor in our case is really characterizing all the frictional characteristics of what we're measuring here. So what I wanted to know was, is his data	21 22	21 22	when I'm building something, if I want to determine the torque I'm going to use on
19 19 complicity the nut factor in our case is really 20 20 characterizing all the frictional 21 21 characteristics of what we're measuring here. 22 22 So what I wanted to know was, is his data 23 23 correct in terms of are we is he getting	21 22 23	21 22 23	when I'm building something, if I want to determine the torque I'm going to use on something, I may pull out a representative nut
complicity the nut factor in our case is really characterizing all the frictional characteristics of what we're measuring here. So what I wanted to know was, is his data	21 22 23	21 22 23 24	when I'm building something, if I want to determine the torque I'm going to use on something, I may pull out a representative nut

44 (Pages 170 - 173)

Page 174			Page 176
1 1 Q All right. But other than one previous case,	1 1	1	Exhibit 95, please.
2 2 you've never in practical application calculated	2 2	2	A One moment.
3 3 nut factor before? This is your second time.	3 3	3	Q You bet.
4 4 MR. MARIANI: Objection of the form.	4 4	4	A The introduction?
5 5 Misstates the testimony.	5 5	5	Q Yes, sir.
6 6 You can answer.	6 6	6	A Yep. Okay.
7 7 THE DEPONENT: You've asked me two	7 7	7	Q Okay. First sentence reads: "The safety,
8 8 different questions. No. 1, I've used	8 8	8	reliability, and the quality of bolted
9 9 performed many calculations in the past for	9 9	9	assemblies are significantly affected by the
10 10 nut with using a nut factor. I have done an	10 1	10	level and by the stability of the fastener
11 11 experimental test to calculate the nut factor at	11 1	11	tension, which is most commonly achieved by
12 12 least two times as it relates to litigation	12 1	12	either churning of the head or the nut of the
13 13 cases.	13 1	13	threaded fastener."
14 14 BY MS. RATHKE:	14 1	14	Do you agree with that statement?
15 15 Q All right. There's an article in your	15 1		A Yes.
16 16 literature file called Bearing Friction Torque	16 1		
17 17 in Bolted Joints.	17 1	17	difficulty in achieving torquing power without
18 18 Are you familiar with that?	18 1		losing torquing force to two different types of
19 19 A I think I am. Could you give me the author,	19 1	19	friction.
20 20 please?	20 2		Is that fair enough as a general statement?
21 21 Q I will do you one better and I will introduce it			A Yeah. This paper is just basically about how to
22 22 as Exhibit 95. And you can tell me whether what	22 2		calculate friction in a joint.
23 23 I've introduced is, indeed, literature that came	23 2		
24 24 from your file.	24 2	24	paragraph on the page that we're on with the
25	25		
Page 175  1 1 (Exhibit No. 95 marked.)	1 1	1	Page 177 introduction, that last paragraph says: "The
2 2 THE DEPONENT: Yes, this came from my file.		2	torque tension relationship is often simplified
3 3 BY MS. RATHKE:		3	by using a tabulated constant known as the nut
4 4 Q Okay. And just for the record, will you agree		4	factor."
5 5 that what's been marked as Exhibit 95 to your		5	That's what you're doing, correct?
6 6 deposition is an article called Bearing Friction			inate what you're doing, confect.
		6	A Yes
/ / Torque in Bolted Joints. The lead author is	7 7		A Yes. O Then it says: "Juvinall" that is
7 7 Torque in Bolted Joints. The lead author is 8 8 Saved, S-A-Y-E-D, Nassar, N-A-S-S-A-R. And the	' '	7	Q Then it says: "Juvinall" that is
8 8 Sayed, S-A-Y-E-D, Nassar, N-A-S-S-A-R. And the	7 7 8 8 9 9	7 8	Q Then it says: "Juvinall" that is J-U-V-I-N-A-L-L, and that's a name, it's a
8 8 Sayed, S-A-Y-E-D, Nassar, N-A-S-S-A-R. And the 9 9 article is dated February 12, 2004.	8 8 9 9	7 8 9	Q Then it says: "Juvinall" that is  J-U-V-I-N-A-L-L, and that's a name, it's a reference to an article "provides an
8 8 Sayed, S-A-Y-E-D, Nassar, N-A-S-S-A-R. And the 9 9 article is dated February 12, 2004. 10 10 Fair enough so far?	8 8 9 9 10 1	7 8 9	Q Then it says: "Juvinall" that is  J-U-V-I-N-A-L-L, and that's a name, it's a  reference to an article "provides an  approximate value of 0.2 for the nut factor but
8 8 Sayed, S-A-Y-E-D, Nassar, N-A-S-S-A-R. And the 9 9 article is dated February 12, 2004. 10 10 Fair enough so far? 11 11 A Yes. Nassar, yes.	8 8 9 9	7 8 9 10	Q Then it says: "Juvinall" that is J-U-V-I-N-A-L-L, and that's a name, it's a reference to an article "provides an approximate value of 0.2 for the nut factor but cautions against using it for critical joints
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8 8 Sayed, S-A-Y-E-D, Nassar, N-A-S-S-A-R. And the 9 9 article is dated February 12, 2004. 10 10 Fair enough so far? 11 11 A Yes. Nassar, yes. 12 12 Q Do you regard Exhibit 95 as authoritative in any 13 13 way? 14 14 A I downloaded this paper funny you ask this 15 15 question. I downloaded this paper because I was 16 16 thinking about doing some calculations to 17 17 incorporate friction into before I did some 18 18 testing, and that's why I downloaded this paper. 19 19 I don't recall much in it. It just convinced me 20 20 that doing an experiment was a better deal than 21 21 doing a calculation. 22 22 Q Okay. Turn, if you will, to what's probably the	8 8 9 9 9 10 1 11 1 1 1 1 1 1 1 1 1 1 1 1 1	7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	Q Then it says: "Juvinall" that is J-U-V-I-N-A-L-L, and that's a name, it's a reference to an article "provides an approximate value of 0.2 for the nut factor but cautions against using it for critical joints without providing guidance as to establish a more reliable yet practical torque tension relationship."  "Bickford provides some mean values of the nut factor for various combinations of joint materials and surface conditions; however, the scatter in the nut factor is too great to render it reliable, particularly in critical joints."  Do you agree with what I read?  A Well, yes, I do because he's speaking of book values for nut factors, not calculated No. 2s.

45 (Pages 174 - 177)

	Page 178			Page 180
1 1	some mean values of the nut factor for various	1	1	How certain are you that this proposition
2 2	combinations of joint materials and surface		2	is supported by that Bickford source?
3 3	conditions; however, the scatter in the nut	3	3	A Would you like me to show you the page?
4 4	factor is too great to render reliable,	4	4	Q Sure. If we can do it, like, reasonably
5 5	particularly in critical joints."	5	5	quickly.
6 6	In other words, if you would go to refer	6	6	A I'm using the 3rd Edition of Bickford. I think
7 7	into Bickford, Bickford would say the best way	7	7	you have the 2nd. On page 229 of the 3rd
8 8	to get a nut factor to apply to a joint would be		8	Edition, it's covered in detail. Actually, it
9 9	to actually do the experiment that I did.		9	starts on page 228.
10 10	Q And the diffuser bolt constitutes a critical	10	10	"Many investigators have found, in fact,
11 11	joint, correct?	11	11	that nut factors determined on a sample" no,
12 12	A That's an answer for Pratt & Whitney.	12	12	that's not right. Yeah.
13 13	-	13	13	_
14 14	report. Page 27.	14	14	the court reporter to have any chance of
15 15	Near the end of that page there's a	15	15	following you here.
16 16	sentence that says: "Literature also shows that	16	16	A Okay. Yes. So on page 229, it says: "A diesel
17 17	simply reusing bolts that have been installed	17		manufacturer reported privately that the torque
18 18	can cause the nut factor to increase or	18	18	required to achieve a desired preload in engine
19 19	decrease, which will thereby alter the effective	19	19	head bolts increased by 50 percent with four
20 20	preload. To mitigate the risk of joint failure	20	20	reassembly operation using the same parts."
21 21	due to the changes in preload, manufacturers	21	21	In other words, to get the preload the
22 22	typically recommend replacing bolts when they	22	22	torque had to go up by 50 percent.
23 23	are removed on critical joints."	23	23	The nut factor in this case increased by
24 24	Do you see that?	24	24	50 percent with the reuse of the fasteners.
25		25		
	Page 179			Page 181
1 1				
	A Yes.	1	1	Another example is an aerospace manufacturer
2 2	Q It is your understanding that the diffuser bolt	2	2	using a seven-eighths of an inch diameter bolt
2 2 3 3	Q It is your understanding that the diffuser bolt constitutes a critical joint, correct?	2 3	2	using a seven-eighths of an inch diameter bolt that was tightened and loosened and then
2 2 3 3 4 4	Q It is your understanding that the diffuser bolt constitutes a critical joint, correct?  MR. MARIANI: Objection. That was just	2 3 4	2 3 4	using a seven-eighths of an inch diameter bolt that was tightened and loosened and then retightened back to the preload. I'm
2 2 3 3 4 4 5 5	Q It is your understanding that the diffuser bolt constitutes a critical joint, correct?  MR. MARIANI: Objection. That was just asked two questions ago.	2 3 4 5	2 3 4 5	using a seven-eighths of an inch diameter bolt that was tightened and loosened and then retightened back to the preload. I'm paraphrasing here. In that particular case, the
2 2 3 3 4 4 5 5 6 6	Q It is your understanding that the diffuser bolt constitutes a critical joint, correct?  MR. MARIANI: Objection. That was just asked two questions ago.  You can answer it again.	2 3 4 5 6	2 3 4 5 6	using a seven-eighths of an inch diameter bolt that was tightened and loosened and then retightened back to the preload. I'm paraphrasing here. In that particular case, the torque decreased by about 50 percent to get the
2 2 3 3 4 4 5 5 6 6 7 7	Q It is your understanding that the diffuser bolt constitutes a critical joint, correct?  MR. MARIANI: Objection. That was just asked two questions ago.  You can answer it again.  MS. RATHKE: Thank you.	2 3 4 5 6 7	2 3 4 5 6 7	using a seven-eighths of an inch diameter bolt that was tightened and loosened and then retightened back to the preload. I'm paraphrasing here. In that particular case, the torque decreased by about 50 percent to get the same preload.
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2 2 3 3 4 4 5 5 6 6 7 7 8 8 9 9	Q It is your understanding that the diffuser bolt constitutes a critical joint, correct?  MR. MARIANI: Objection. That was just asked two questions ago.  You can answer it again.  MS. RATHKE: Thank you.  THE DEPONENT: Like I said, I think that's something for Pratt & Whitney. It's not for me	2 3 4 5 6 7 8 8	2 3 4 5 6 7 8	using a seven-eighths of an inch diameter bolt that was tightened and loosened and then retightened back to the preload. I'm paraphrasing here. In that particular case, the torque decreased by about 50 percent to get the same preload.  Q And is your testimony that this is the portion of the Bickford treatise, the 3rd Edition that
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46 (Pages 178 - 181)

Page 182	Page 18
1 1 A Yeah, a machine design book.	1 1 Q Okay. And the reason that you didn't attend is
2 2 Q Okay. You also don't have a pin cite for that.	2 2 because you weren't asked to; is that correct?
3 3 So directionally which chapter would that	3 3 A Correct.
4 4 be in, in the Shigley	4 4 Q Do you have knowledge as to how much tensile
5 5 A Here. I'll get you that reference as well. One	5 5 force a diffuser bolt on a PW530A engine is
6 6 moment.	6 6 subject to during operation?
7 7 Okay. On page 473 of Shigley: "The	7 7 A In addition to the preload?
8 8 prudent designer protects against these	8 8 Q Yes.
9 9 circumstances because the reassembled joint is	9 9 A No. I suspect that most loads that are it's
10 10 different, in italics, only to the permanent set	10 10 subjected to are probably more on the range of
11 11 and the fasteners for which torque tension	11 11 prying and bending loads than pure tension
12 12 relationship is now unknown. Furthermore, for	12 12 loads.
13 13 the same torque, the initial tension will be	13 13 Q And what's your suspicion based on?
14 14 less than the designer had specified."	14 14 A The shape of the joint, the eccentricity of the
15 15 He's citing a specific example here. But	15 15 joint.
16 16 he's saying the exact same thing that I just	16 16 Q And what do you mean by that exactly?
pointed out in my report. That's page 473.	17 17 A Essentially it's a flange joint, and because
18 18 Q Okay. Have you now shared with me all of the	18 18 it's a flange joint, the way it's going to be
19 19 sources that you believe support your statement	19 19 loaded, it's going to create prying on the
20 20 ending with footnote 15 in your Exhibit 91?	20 20 joint. And that is a condition that you have to
21 21 A Oh, I'm sure there's others but those are the	21 21 be aware of in a bolted joint design.
22 22 two that I used as a cite. It's pretty well	22 22 Q I am turning back to Clarksburg. How would you
23 23 known.	23 23 have measured the torque of the diffuser bolts
24 24 It's also in The Handbook of Bolted Joints.	24 24 that were still installed on the subject
25	25
Page 183	Page 18
1 1 It's probably the same verbiage.	1 1 engines?
2 2 Q The other Bickford?	2 2 A Honestly, I would have verified that they were
3 3 A Yes.	3 3 all torqued over 30 inch-pounds. And I would
4 4 Q Of the handbook Bickford?	4 4 have walked away if I wanted to know the actual
5 5 A Yes.	5 5 removal torques, I would have had a wrench large
6 6 Q All right. Within your Exhibit 91, you have	
y y y y y	6 6 enough to actually get the removal torque.
7 7 some commentary and discussion on the bolt	<ul> <li>6 6 enough to actually get the removal torque.</li> <li>7 7 Q And is that your only criticism of Mr. Meyers'</li> </ul>
	7 7 Q And is that your only criticism of Mr. Meyers' 8 8 breakaway torque measurements?
7 7 some commentary and discussion on the bolt	<ul> <li>7 7 Q And is that your only criticism of Mr. Meyers'</li> <li>8 8 breakaway torque measurements?</li> <li>9 9 A I think I summarized my criticism of his</li> </ul>
7 7 some commentary and discussion on the bolt 8 8 removal testing done by Mr. Meyers at EMS in 9 9 Clarksburg, West Virginia, in December, correct? 10 10 A Yes.	<ul> <li>7 7 Q And is that your only criticism of Mr. Meyers'</li> <li>8 8 breakaway torque measurements?</li> <li>9 9 A I think I summarized my criticism of his</li> <li>10 10 measurements in my report thoroughly.</li> </ul>
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Page 186			Page 188
1 1 that could register the value of the actual	1	1	but I would say after it's been operating in an
2 2 breakaway torque.	2	2	engine for a period of time, it's no longer
3 3 Q What else would you have done different from	3	3	valid.
4 4 what Mr. Meyers did?	4	4	Q Like a week?
5 5 A Well, I would never I would never have done	5	5	A If it's been in the engine a week, yes. If the
6 6 the other test that he did, the reinstallation	6	6	engine has been running.
7 7 test and the measurement test. As I've covered,	7	7	Q Okay. Yes, valid, or yes, invalid?
8 8 those tests are completely invalid.	8	8	A Well, I haven't done the testing to confirm
9 9 Q Okay. But with regard to the breakaway torque	9	9	where the validity begins and ends, but I can
10 10 measurement, what else would you have done	10	10	tell you that as soon as the engine is exposed
11 11 different from what Mr. Meyers did, other than	11	11	to temperature and it's been run and it's been
12 12 having a bigger wrench?	12	12	subjected to the operational stresses, at that
13 13 A I would have recorded the numbers.	13	13	point all bets are off.
14 14 Q Okay. Anything else?	14	14	Q Okay. You understand that Pratt & Whitney is
15 15 A I already told you, I consider the whole concept	15		the designer of these bolts, correct?
16 16 of the test invalid. So I told you what I would			A No, I don't understand that they designed these
17 17 have done if I were to do testing. I don't know	17		bolts.
18 18 what else to say.	18		C - J
19 19 Q Well, I know you consider the test to be	19		litigation, or the entities involved in this
20 20 invalid, but if you wanted if you thought	20		litigation, Pratt & Whitney is in the best
21 21 breakaway torque was of concern, if you thought	21		position to understand the physical properties
22 22 torque values were of concern, how would you	22		of these bolts, correct?
23 23 measure breakaway torque, or how would you try	23		MR. MARIANI: Objection as to the form of
24 24 to measure the torque of still-installed bolts,	24	24	your question. Lack of foundation. Improperly
25	25		
Page 187  1 1 or would you not try to do it because it's	1	1	Page 189 characterizes the parties in the case.
2 2 not	2	2	You can answer.
	-	_	1 ou can answer.
1 3 3 Δ It's like I said you can't do it It's stated	3	3	THE DEPONENT: I don't think that Pratt &
3 3 A It's like I said, you can't do it. It's stated	3	3	THE DEPONENT: I don't think that Pratt & Whitney is in any better position than Fusion
4 4 in the literature. You know, breakaway torque	4	4	Whitney is in any better position than Fusion
4 4 in the literature. You know, breakaway torque 5 5 is good to determine if a bolt's torqued enough.	5	4 5	Whitney is in any better position than Fusion Engineering or ESI to characterize the
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		Page 192
1 1	Q	I do not.
2 2		MR. MARIANI: Give me one second. I've
3 3	o	opened it three times, and it keeps opening but
4 4		not the whole document. So assuming you're
5 5		going to be going through various pages, I can't
6 6		ee it all. So the same problem we're having
7 7		pefore.
8 8		Rich, do you know any solution on this, why
9 9	S	ome exhibits we're only getting to see some of
10 10		the pages when we open them?
11 1		THE DEPONENT: I can't find my copy, so
12 13	. 1	I'll work with yours. Okay.
13 13		MS. RATHKE:
14 14	Q	Have you seen Exhibit 96 before?
		And Exhibit 96 is a Pratt & Whitney
		investigation as to another MS9696-24 diffuser
18 18		bolt failure; yes?
		Yes, from DAO517.
		All right. If you turn to the fourth page
22 2	2 (	of the PDF, you should be on a page that
23 23		two-thirds of the way down the page there should
24 24	1	be a header called Discussion. Let me know when
25		
23		
23		Page 193
1 1		you're there.
1 1	A	you're there. Yes.
1 1 2 2 3 3	A Q	Yes. All right. The last paragraph on that page
1 1 2 2 3 3 4 4	A Q s	You're there. Yes. All right. The last paragraph on that page ays: "The analyses performed by the chemical
1 1 2 2 3 3 4 4 5 5	A Q s	Yes. All right. The last paragraph on that page ays: "The analyses performed by the chemical echnology and tests suggests that an anti-seize
1 1 2 2 3 3 3 4 4 4 5 5 5 6 6 6	A Q s to	Yes. All right. The last paragraph on that page ays: "The analyses performed by the chemical echnology and tests suggests that an anti-seize compound has been applied on the threads;
1 1 2 2 3 3 3 4 4 4 5 5 5 6 6 6 7 7 7	A Q s to c the	Yes. All right. The last paragraph on that page ays: "The analyses performed by the chemical echnology and tests suggests that an anti-seize compound has been applied on the threads; therefore, the expected clamping force should
1 1 2 2 3 3 3 4 4 4 5 5 6 6 6 7 7 8 8 8	A Q S to C the h	Yes.  All right. The last paragraph on that page ays: "The analyses performed by the chemical echnology and tests suggests that an anti-seize compound has been applied on the threads; therefore, the expected clamping force should have been obtained if the torque was properly
1 1 2 2 3 3 3 4 4 4 5 5 5 6 6 6 7 7 8 8 8 9 9	A Q s to c the h a	Yes. All right. The last paragraph on that page ays: "The analyses performed by the chemical echnology and tests suggests that an anti-seize compound has been applied on the threads; therefore, the expected clamping force should have been obtained if the torque was properly applied. The latter can generally be assessed
1 1 1 2 2 2 3 3 3 4 4 4 5 5 5 6 6 6 7 7 7 8 8 8 9 9 9 10 10	A Q S to c the h a a b l	Yes. All right. The last paragraph on that page ays: "The analyses performed by the chemical echnology and tests suggests that an anti-seize compound has been applied on the threads; therefore, the expected clamping force should have been obtained if the torque was properly applied. The latter can generally be assessed by measuring the breakaway torque upon their
1 1 2 2 3 3 3 4 4 4 5 5 6 6 6 7 7 8 8 8 9 9 10 10 10 11 1	A Q S to C the aa a l l l	Yes. All right. The last paragraph on that page ays: "The analyses performed by the chemical echnology and tests suggests that an anti-seize compound has been applied on the threads; therefore, the expected clamping force should have been obtained if the torque was properly applied. The latter can generally be assessed by measuring the breakaway torque upon their removal if the assembly has not undergone some
1 1 1 2 2 2 3 3 3 4 4 4 5 5 5 6 6 6 7 7 7 8 8 8 9 9 10 10 11 11 11 12 12	A Q S to C C the h a a D H A C C C	Yes. All right. The last paragraph on that page ays: "The analyses performed by the chemical echnology and tests suggests that an anti-seize compound has been applied on the threads; therefore, the expected clamping force should have been obtained if the torque was properly applied. The latter can generally be assessed by measuring the breakaway torque upon their removal if the assembly has not undergone some distress where cracking fracture."
1 1 1 2 2 2 3 3 3 4 4 4 5 5 5 6 6 6 7 7 7 8 8 8 9 9 10 10 11 1 1 1 1 1 1 1 1 1 1 1 1 1	A Q s to c the a a l to c the a c the c the a	Yes. All right. The last paragraph on that page ays: "The analyses performed by the chemical echnology and tests suggests that an anti-seize compound has been applied on the threads; therefore, the expected clamping force should have been obtained if the torque was properly applied. The latter can generally be assessed by measuring the breakaway torque upon their removal if the assembly has not undergone some distress where cracking fracture."  Do you see that?
1 1 1 2 2 3 3 3 4 4 4 5 5 5 6 6 6 7 7 7 8 8 8 9 9 9 10 10 11 11 12 12 13 13 13 14 14 14	A Q s to c c the halo b let a	Yes.  All right. The last paragraph on that page ays: "The analyses performed by the chemical echnology and tests suggests that an anti-seize compound has been applied on the threads; therefore, the expected clamping force should have been obtained if the torque was properly applied. The latter can generally be assessed by measuring the breakaway torque upon their removal if the assembly has not undergone some distress where cracking fracture."  Do you see that?  Yes.
1 1 1 2 2 3 3 3 4 4 4 5 5 5 6 6 6 7 7 7 8 8 8 9 9 10 10 11 11 12 12 13 13 14 14 14 15 15	A Q S to c c till h a a l l l l l l l l l l l l l l l l	Yes. All right. The last paragraph on that page ays: "The analyses performed by the chemical echnology and tests suggests that an anti-seize compound has been applied on the threads; therefore, the expected clamping force should have been obtained if the torque was properly applied. The latter can generally be assessed by measuring the breakaway torque upon their removal if the assembly has not undergone some distress where cracking fracture."  Do you see that?  Yes.  Fair to say that Pratt & Whitney uses the
1 1 1 2 2 3 3 3 4 4 4 5 5 5 6 6 6 7 7 7 8 8 8 9 9 10 10 11 11 12 12 13 13 14 14 15 15 15 15 16 16	A Q S to c c till h a a c c c c till h a c c c c till h a c c c c c till h a c c c c c c c c c c c c c c c c c c	Yes. All right. The last paragraph on that page ays: "The analyses performed by the chemical echnology and tests suggests that an anti-seize compound has been applied on the threads; herefore, the expected clamping force should have been obtained if the torque was properly applied. The latter can generally be assessed by measuring the breakaway torque upon their removal if the assembly has not undergone some distress where cracking fracture."  Do you see that?  Yes.  Fair to say that Pratt & Whitney uses the manufacturer of this bolt or the designer of
1 1 1 2 2 3 3 3 4 4 4 5 5 5 6 6 6 7 7 7 8 8 8 9 9 10 10 11 11 12 12 13 13 14 14 15 13 16 16 17 11	A Q S to	All right. The last paragraph on that page ays: "The analyses performed by the chemical echnology and tests suggests that an anti-seize compound has been applied on the threads; therefore, the expected clamping force should have been obtained if the torque was properly applied. The latter can generally be assessed by measuring the breakaway torque upon their removal if the assembly has not undergone some distress where cracking fracture."  Do you see that?  Yes.  Fair to say that Pratt & Whitney uses the manufacturer of this bolt or the designer of this joint uses breakaway torque to characterize
1 1 1 2 2 2 3 3 3 4 4 4 5 5 5 6 6 6 7 7 7 8 8 8 9 9 9 10 10 10 11 11 12 12 13 13 14 14 14 15 15 15 16 16 17 17 18 18	A Q S to c c till h a a l l l l l l l l l l l l l l l l	All right. The last paragraph on that page ays: "The analyses performed by the chemical echnology and tests suggests that an anti-seize compound has been applied on the threads; therefore, the expected clamping force should have been obtained if the torque was properly applied. The latter can generally be assessed by measuring the breakaway torque upon their removal if the assembly has not undergone some distress where cracking fracture."  Do you see that?  Yes.  Fair to say that Pratt & Whitney uses the manufacturer of this bolt or the designer of this joint uses breakaway torque to characterize the torque value of the joint?
1 1 1 2 2 3 3 3 4 4 4 5 5 5 6 6 6 7 7 7 8 8 8 9 9 10 10 10 11 11 12 12 13 13 14 14 14 15 13 16 16 16 17 17 18 18 18 19 19	A Q S to c c the c c the c c c the c c c the c c c the c c c c the c c c c c c c c c c c c c c c c c c c	All right. The last paragraph on that page ays: "The analyses performed by the chemical echnology and tests suggests that an anti-seize compound has been applied on the threads; therefore, the expected clamping force should have been obtained if the torque was properly applied. The latter can generally be assessed by measuring the breakaway torque upon their removal if the assembly has not undergone some distress where cracking fracture."  Do you see that?  Yes.  Fair to say that Pratt & Whitney uses the manufacturer of this bolt or the designer of this joint uses breakaway torque to characterize the torque value of the joint?  MR. MARIANI: Objection. Calls for
1 1 1 2 2 3 3 3 4 4 4 5 5 5 6 6 6 7 7 7 8 8 8 9 9 10 10 11 11 12 12 13 13 14 14 15 15 15 16 16 17 17 18 18 19 19 20 20	A Q S to c c till h a a b c c c c c c c c c c c c c c c c c	All right. The last paragraph on that page ays: "The analyses performed by the chemical echnology and tests suggests that an anti-seize compound has been applied on the threads; herefore, the expected clamping force should have been obtained if the torque was properly applied. The latter can generally be assessed by measuring the breakaway torque upon their removal if the assembly has not undergone some distress where cracking fracture."  Do you see that?  Yes.  Fair to say that Pratt & Whitney uses the manufacturer of this bolt or the designer of this joint uses breakaway torque to characterize the torque value of the joint?  MR. MARIANI: Objection. Calls for speculation.
1 1 1 2 2 2 3 3 3 4 4 4 5 5 5 6 6 6 7 7 7 8 8 8 9 9 10 10 11 11 12 12 13 13 14 14 15 15 15 16 16 10 17 17 18 18 19 19 20 20 20 21 2	A Q S to c c tll h a a l l l l l l l l l l l l l l l l	All right. The last paragraph on that page ays: "The analyses performed by the chemical echnology and tests suggests that an anti-seize compound has been applied on the threads; herefore, the expected clamping force should have been obtained if the torque was properly applied. The latter can generally be assessed by measuring the breakaway torque upon their removal if the assembly has not undergone some distress where cracking fracture."  Do you see that?  Yes.  Fair to say that Pratt & Whitney uses the manufacturer of this bolt or the designer of this joint uses breakaway torque to characterize the torque value of the joint?  MR. MARIANI: Objection. Calls for speculation.  You can answer.
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1 1 1 2 2 2 3 3 3 4 4 4 5 5 5 6 6 6 7 7 7 8 8 8 9 9 10 10 11 11 12 13 13 13 14 14 14 15 13 16 16 10 17 17 18 18 19 19 20 20 20 21 2 22 23 23 23	A Q S to c c the c c the c c c the c c c the c c c the c c c c the c c c c c c c c c c c c c c c c c c c	All right. The last paragraph on that page ays: "The analyses performed by the chemical echnology and tests suggests that an anti-seize compound has been applied on the threads; therefore, the expected clamping force should have been obtained if the torque was properly applied. The latter can generally be assessed by measuring the breakaway torque upon their removal if the assembly has not undergone some distress where cracking fracture."  Do you see that?  Yes.  Fair to say that Pratt & Whitney uses the manufacturer of this bolt or the designer of this joint uses breakaway torque to characterize the torque value of the joint?  MR. MARIANI: Objection. Calls for speculation.  You can answer.  THE DEPONENT: I'm sorry, Ray.  MR. MARIANI: Yep. I said objection.
1 1 1 2 2 2 3 3 3 4 4 4 5 5 5 6 6 6 7 7 7 8 8 8 9 9 10 10 10 11 1 1 1 1 1 1 1 1 1 1 1 1	A Q S to c c the c c the c c c the c c c the c c c the c c c c the c c c c c c c c c c c c c c c c c c c	All right. The last paragraph on that page ays: "The analyses performed by the chemical echnology and tests suggests that an anti-seize compound has been applied on the threads; therefore, the expected clamping force should have been obtained if the torque was properly applied. The latter can generally be assessed by measuring the breakaway torque upon their removal if the assembly has not undergone some distress where cracking fracture."  Do you see that?  Yes.  Fair to say that Pratt & Whitney uses the manufacturer of this bolt or the designer of this joint uses breakaway torque to characterize the torque value of the joint?  MR. MARIANI: Objection. Calls for speculation.  You can answer.  THE DEPONENT: I'm sorry, Ray.
	2 2 3 3 4 4 4 5 5 5 6 6 6 7 7 7 8 8 8 9 9 10 10 11 11 11 12 12 13 13 14 14 15 15 16 16 17 17 18 18 19 19 20 20 21 21 22 22 23 23 24 24	2 2 3 3 6 4 4 7 5 5 8 6 6 8 7 7 8 8 8 9 9 8 10 10 11 11 12 12 13 13 BY 14 14 Q 15 15 A 16 16 Q 17 17 18 18 19 19 A 20 20 Q 21 21 22 22 23 23 24 24

49 (Pages 190 - 193)

Page 194			Page 196
1 1 You can answer.	1	1	
2 2 THE DEPONENT: Okay. So what they're	2	2	A Status work, manufactured.
3 3 talking about here is, if you read this in the	3	3	Q Yes.
4 4 correct context, which I don't think you are,	4	4	A That means it's a manufactured part.
5 5 they're talking about the use of anti-seize to	5	5	Q Are you familiar with these certificates of
6 6 verify that anti-seize was put on the thread so	6	6	conformity?
7 7 they get the correct preload when they install	7	7	A I've seen them before.
8 8 it. What he's concerned about is it being	8	8	Q All right. Do you understand that box 12 means
9 9 undertorqued or not having enough preload, and I	9	9	that the entity indicated in box 4 is the
10 10 agree with his statement that you can measure	10	10	manufacturer, correct?
11 11 breakaway torque to determine if you had enough.	11	11	MR. MARIANI: I want to ask you to hold one
12 12 It's just hard to tell it doesn't give you	12	12	second. I can't see the document in the
13 13 good information if it was overtorqued,	13	13	Veritext platform because it's sideways. And if
14 14 unfortunately.	14	14	I try to blow it up, it becomes distorted. So I
15 15 BY MS. RATHKE:	15	15	can't see it there. So I've got to open it in
16 16 Q The purpose of breakaway torque is to just	16	16	the production that was (connection
17 17 simply measure the amount of torque, is it not?	17	17	interruption), so hold on, please.
18 18 A Yes, the required torque to get it to move.	18	18	Are you referring to the first or second
19 19 Q Yes. Which is something that Pratt & Whitney	19	19	page of the exhibit, Sarah?
20 20 has done in this Exhibit 96, correct?	20	20	MS. RATHKE: Page 1.
21 21 A No, they haven't done. They suggested it.	21	21	MR. MARIANI: Okay. It's still when you
22 22 Q All right. They suggested it.	22	22	blow it up, it's maybe yours is clear. Mine
23 23 And it's the same bolted joint at issue as	23	23	is completely blurry when I blow it up to try to
24 24 the one at issue in our case.	24	24	see what it says in these boxes.
25	25		
Page 195			Page 197
1 1 A Yes.	1		MS. RATHKE: Ray, we all deal with
1 1 A Yes. 2 2 Q All right. Let's you know, I'm going to	2	2	MS. RATHKE: Ray, we all deal with challenges. We're doing the best we can.
<ol> <li>1 A Yes.</li> <li>2 Q All right. Let's you know, I'm going to</li> <li>3 3 introduce an exhibit that we found that came</li> </ol>	2 3	2	MS. RATHKE: Ray, we all deal with challenges. We're doing the best we can.  MR. MARIANI: Aaron, are you able to read
<ol> <li>1 A Yes.</li> <li>2 Q All right. Let's you know, I'm going to</li> <li>3 3 introduce an exhibit that we found that came</li> <li>4 4 from your files. Let's see here.</li> </ol>	2 3 4	2 3 4	MS. RATHKE: Ray, we all deal with challenges. We're doing the best we can.  MR. MARIANI: Aaron, are you able to read this document by pulling it up?
<ol> <li>1 A Yes.</li> <li>2 Q All right. Let's you know, I'm going to</li> <li>3 introduce an exhibit that we found that came</li> <li>4 from your files. Let's see here.</li> <li>5 I'm terrible at this.</li> </ol>	2 3 4 5	2 3 4 5	MS. RATHKE: Ray, we all deal with challenges. We're doing the best we can.  MR. MARIANI: Aaron, are you able to read this document by pulling it up?  MS. RATHKE: Me? Yes.
<ol> <li>1 A Yes.</li> <li>2 Q All right. Let's you know, I'm going to</li> <li>3 introduce an exhibit that we found that came</li> <li>4 from your files. Let's see here.</li> <li>5 I'm terrible at this.</li> <li>6 All right. Here we go. I'm marking</li> </ol>	2 3 4 5 6	2 3 4 5 6	MS. RATHKE: Ray, we all deal with challenges. We're doing the best we can.  MR. MARIANI: Aaron, are you able to read this document by pulling it up?  MS. RATHKE: Me? Yes.  THE DEPONENT: Yes.
<ol> <li>1 A Yes.</li> <li>2 Q All right. Let's you know, I'm going to</li> <li>3 introduce an exhibit that we found that came</li> <li>4 from your files. Let's see here.</li> <li>5 I'm terrible at this.</li> <li>6 All right. Here we go. I'm marking</li> <li>7 Exhibit 97, which is a paper that came from your</li> </ol>	2 3 4 5 6 7	2 3 4 5 6 7	MS. RATHKE: Ray, we all deal with challenges. We're doing the best we can.  MR. MARIANI: Aaron, are you able to read this document by pulling it up?  MS. RATHKE: Me? Yes.  THE DEPONENT: Yes.  MR. MARIANI: All right. Go ahead.
<ol> <li>1 A Yes.</li> <li>2 Q All right. Let's you know, I'm going to</li> <li>3 introduce an exhibit that we found that came</li> <li>4 from your files. Let's see here.</li> <li>5 I'm terrible at this.</li> <li>6 All right. Here we go. I'm marking</li> <li>7 Exhibit 97, which is a paper that came from your</li> <li>8 working files. It should now be uploaded. Let</li> </ol>	2 3 4 5 6 7 8	2 3 4 5 6 7 8	MS. RATHKE: Ray, we all deal with challenges. We're doing the best we can.  MR. MARIANI: Aaron, are you able to read this document by pulling it up?  MS. RATHKE: Me? Yes.  THE DEPONENT: Yes.  MR. MARIANI: All right. Go ahead.  BY MS. RATHKE:
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50 (Pages 194 - 197)

		Page 198			Page 200
1	1	BY MS. RATHKE:	1	1	MS. BLACK: It's already done, Sarah. It's
2	2	Q So Exhibit 97 page 1 relates to bolts, not	2	2	reloaded.
3	3	nuts. You see that, correct?	3	3	THE DEPONENT: All I'm getting is an
4	4	A Correct. I'm going to answer your question by	4	4	exhibit number.
5	5	saying I don't know.	5	5	MS. RATHKE: Yep. Hold on a second.
6	6	Q Okay. So you just don't know who the	6	6	Let me try this again. It's going to give
7	7	manufacturer is of these bolts?	7	7	it a new number because I don't have any choice,
8	8	A I just know that when I ordered and I'm	8	8	so bear with me. What's coming up should be
9	9	working on memory here. No, I don't know for	9	9	Exhibit 99.
10	10	sure. For some reason I thought it was Textron	10	10	(Exhibit No. 99 marked.)
11	11	Aviation manufactured them, but I could be	11	11	MS. RATHKE: And with any luck it will be
12	12	completely wrong.	12	12	visible.
13	13	Q Okay. And is what's been marked as Exhibit 97,	13	13	MR. MARIANI: Aaron, are you able to open
14	14	is this the French language document that you	14	14	it?
15	15	were thinking of that you referred to earlier?	15	15	THE DEPONENT: Yes.
16	16	A I think so, but I thought there was another one.	16	16	BY MS. RATHKE:
17	17	It might be with our evidence artifacts, but I	17	17	Q Okay. Is Exhibit 99 an NTSB aviation incident
18	18	don't recall.	18	18	final report that you examined because it was in
19	19	Q Okay.	19	19	Mr. Meyers' expert file?
20	20	A It might have been on the receipt or something	20	20	A I will verify it. I assume you got this out of
21	21	that came on the nuts. I don't recall, but I	21	21	my file, but I'll verify it.
22	22	don't profess to know everything about that I	22	22	Yes, I have it in my file.
23	23	think that's like an airworthiness or approved	23		Q All right. Starting out on the first page under
24	24	part. I don't profess to know that type of	24	24	Analysis, Exhibit 99 states: "The pilot
25			25		
		Page 199			Page 201
1	1	stuff.	1		executed a forced landing when the airplane
2	2	Q Okay.	2		experienced a total loss of engine power during
3		A That would be for Mr. Cheyne.	3	3	cruise flight. Examination of the engine
4	4	Q All right. You said that you reviewed a		4	crankshaft and attached rod components revealed
5	5	quantity or somebody from your office		5	that both nuts on the No. 3 connecting rod were
6	6	reviewed a quantity of NTSB investigation		6	backed off from their original installed
7	7	reports in connection with this matter that  Mr. Meyers described in his expert report; is	7	7	position. One nut on the No. 4 connecting rod
	8		0		-
	Λ		8	8	had also backed off but had not failed."
	9	that a fair characterization?	9	8 9	had also backed off but had not failed."  Do you see that?
11	10	that a fair characterization?  A Yes.	9 10	8 9 10	had also backed off but had not failed."  Do you see that?  A What page are you on?
	10 11	that a fair characterization?  A Yes.  Q All right. Let me mark another exhibit. In a	9 10 11	8 9 10 11	had also backed off but had not failed."  Do you see that?  A What page are you on?  Q No. 1, first few sentences.
12	10 11 12	that a fair characterization?  A Yes.  Q All right. Let me mark another exhibit. In a moment Exhibit 98 should be evident to you on	9 10 11 12	8 9 10 11 12	had also backed off but had not failed."  Do you see that?  A What page are you on?  Q No. 1, first few sentences.  A Yeah. One moment. Let me open it in my system
12 13	10 11 12 13	that a fair characterization?  A Yes.  Q All right. Let me mark another exhibit. In a moment Exhibit 98 should be evident to you on your screen.	9 10 11 12 13	8 9 10 11 12 13	had also backed off but had not failed."  Do you see that?  A What page are you on?  Q No. 1, first few sentences.  A Yeah. One moment. Let me open it in my system viewer. This thing is terrible. I apologize.
12 13 14	10 11 12 13 14	that a fair characterization?  A Yes.  Q All right. Let me mark another exhibit. In a moment Exhibit 98 should be evident to you on your screen.  MS. RATHKE: Ray, I suspect you're going to	9 10 11 12 13 14	8 9 10 11 12 13 14	had also backed off but had not failed."  Do you see that?  A What page are you on?  Q No. 1, first few sentences.  A Yeah. One moment. Let me open it in my system viewer. This thing is terrible. I apologize.  Okay. Yeah, I have it now. First
12 13 14 15	10 11 12 13 14 15	that a fair characterization?  A Yes.  Q All right. Let me mark another exhibit. In a moment Exhibit 98 should be evident to you on your screen.  MS. RATHKE: Ray, I suspect you're going to have to refresh. We'll wait for you to do so.	9 10 11 12 13 14 15	8 9 10 11 12 13 14 15	had also backed off but had not failed."  Do you see that?  A What page are you on?  Q No. 1, first few sentences.  A Yeah. One moment. Let me open it in my system viewer. This thing is terrible. I apologize.  Okay. Yeah, I have it now. First paragraph.
12 13 14 15 16	10 11 12 13 14 15 16	that a fair characterization?  A Yes.  Q All right. Let me mark another exhibit. In a moment Exhibit 98 should be evident to you on your screen.  MS. RATHKE: Ray, I suspect you're going to have to refresh. We'll wait for you to do so.  THE DEPONENT: Ray, I do believe you're	9 10 11 12 13 14 15 16	8 9 10 11 12 13 14 15	had also backed off but had not failed."  Do you see that?  A What page are you on?  Q No. 1, first few sentences.  A Yeah. One moment. Let me open it in my system viewer. This thing is terrible. I apologize.  Okay. Yeah, I have it now. First paragraph.  Q Yeah. I read the first three sentences.
12 13 14 15 16 17	10 11 12 13 14 15 16 17	that a fair characterization?  A Yes.  Q All right. Let me mark another exhibit. In a moment Exhibit 98 should be evident to you on your screen.  MS. RATHKE: Ray, I suspect you're going to have to refresh. We'll wait for you to do so.  THE DEPONENT: Ray, I do believe you're jinxing me.	9 10 11 12 13 14 15 16 17	8 9 10 11 12 13 14 15 16 17	had also backed off but had not failed."  Do you see that?  A What page are you on?  Q No. 1, first few sentences.  A Yeah. One moment. Let me open it in my system viewer. This thing is terrible. I apologize.  Okay. Yeah, I have it now. First paragraph.  Q Yeah. I read the first three sentences.  A Okay.
12 13 14 15 16 17 18	10 11 12 13 14 15 16 17	that a fair characterization?  A Yes.  Q All right. Let me mark another exhibit. In a moment Exhibit 98 should be evident to you on your screen.  MS. RATHKE: Ray, I suspect you're going to have to refresh. We'll wait for you to do so.  THE DEPONENT: Ray, I do believe you're jinxing me.  MR. MARIANI: Same issues. It comes up,	9 10 11 12 13 14 15 16 17 18	8 9 10 11 12 13 14 15 16 17 18	had also backed off but had not failed."  Do you see that?  A What page are you on?  Q No. 1, first few sentences.  A Yeah. One moment. Let me open it in my system viewer. This thing is terrible. I apologize.  Okay. Yeah, I have it now. First paragraph.  Q Yeah. I read the first three sentences.  A Okay.  Q Okay. Flip to page 4 of the PDF. Fourth
12 13 14 15 16 17 18 19	10 11 12 13 14 15 16 17 18	that a fair characterization?  A Yes.  Q All right. Let me mark another exhibit. In a moment Exhibit 98 should be evident to you on your screen.  MS. RATHKE: Ray, I suspect you're going to have to refresh. We'll wait for you to do so.  THE DEPONENT: Ray, I do believe you're jinxing me.  MR. MARIANI: Same issues. It comes up, but so far it's all blank pages.	9 10 11 12 13 14 15 16 17 18	8 9 10 11 12 13 14 15 16 17 18	had also backed off but had not failed."  Do you see that?  A What page are you on?  Q No. 1, first few sentences.  A Yeah. One moment. Let me open it in my system viewer. This thing is terrible. I apologize.  Okay. Yeah, I have it now. First paragraph.  Q Yeah. I read the first three sentences.  A Okay.  Q Okay. Flip to page 4 of the PDF. Fourth paragraph down, starts with the words "The
12 13 14 15 16 17 18 19 20	10 11 12 13 14 15 16 17 18 19 20	that a fair characterization?  A Yes.  Q All right. Let me mark another exhibit. In a moment Exhibit 98 should be evident to you on your screen.  MS. RATHKE: Ray, I suspect you're going to have to refresh. We'll wait for you to do so.  THE DEPONENT: Ray, I do believe you're jinxing me.  MR. MARIANI: Same issues. It comes up, but so far it's all blank pages.  MS. SUSZYNSKI: I actually get blank pages	9 10 11 12 13 14 15 16 17 18 19 20	8 9 10 11 12 13 14 15 16 17 18 19 20	had also backed off but had not failed."  Do you see that?  A What page are you on?  Q No. 1, first few sentences.  A Yeah. One moment. Let me open it in my system viewer. This thing is terrible. I apologize.  Okay. Yeah, I have it now. First paragraph.  Q Yeah. I read the first three sentences.  A Okay.  Q Okay. Flip to page 4 of the PDF. Fourth paragraph down, starts with the words "The position." And let me know when you're with me.
12 13 14 15 16 17 18 19 20 21	10 11 12 13 14 15 16 17 18 19 20 21	that a fair characterization?  A Yes.  Q All right. Let me mark another exhibit. In a moment Exhibit 98 should be evident to you on your screen.  MS. RATHKE: Ray, I suspect you're going to have to refresh. We'll wait for you to do so.  THE DEPONENT: Ray, I do believe you're jinxing me.  MR. MARIANI: Same issues. It comes up, but so far it's all blank pages.  MS. SUSZYNSKI: I actually get blank pages on this one too.	9 10 11 12 13 14 15 16 17 18 19 20 21	8 9 10 11 12 13 14 15 16 17 18 19 20 21	had also backed off but had not failed."  Do you see that?  A What page are you on?  Q No. 1, first few sentences.  A Yeah. One moment. Let me open it in my system viewer. This thing is terrible. I apologize.  Okay. Yeah, I have it now. First paragraph.  Q Yeah. I read the first three sentences.  A Okay.  Q Okay. Flip to page 4 of the PDF. Fourth paragraph down, starts with the words "The position." And let me know when you're with me.  Okay. You're with me. I'm going to read
12 13 14 15 16 17 18 19 20 21 22	10 11 12 13 14 15 16 17 18 19 20 21 22	that a fair characterization?  A Yes.  Q All right. Let me mark another exhibit. In a moment Exhibit 98 should be evident to you on your screen.  MS. RATHKE: Ray, I suspect you're going to have to refresh. We'll wait for you to do so.  THE DEPONENT: Ray, I do believe you're jinxing me.  MR. MARIANI: Same issues. It comes up, but so far it's all blank pages.  MS. SUSZYNSKI: I actually get blank pages on this one too.  THE DEPONENT: I get seven blank pages.	9 10 11 12 13 14 15 16 17 18 19 20 21 22	8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	had also backed off but had not failed."  Do you see that?  A What page are you on?  Q No. 1, first few sentences.  A Yeah. One moment. Let me open it in my system viewer. This thing is terrible. I apologize.  Okay. Yeah, I have it now. First paragraph.  Q Yeah. I read the first three sentences.  A Okay.  Q Okay. Flip to page 4 of the PDF. Fourth paragraph down, starts with the words "The position." And let me know when you're with me.  Okay. You're with me. I'm going to read that into the record.
12 13 14 15 16 17 18 19 20 21 22 23	10 11 12 13 14 15 16 17 18 19 20 21	that a fair characterization?  A Yes.  Q All right. Let me mark another exhibit. In a moment Exhibit 98 should be evident to you on your screen.  MS. RATHKE: Ray, I suspect you're going to have to refresh. We'll wait for you to do so.  THE DEPONENT: Ray, I do believe you're jinxing me.  MR. MARIANI: Same issues. It comes up, but so far it's all blank pages.  MS. SUSZYNSKI: I actually get blank pages on this one too.  THE DEPONENT: I get seven blank pages.  MS. RATHKE: All right. Marissa, can you	9 10 11 12 13 14 15 16 17 18 19 20 21	8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	had also backed off but had not failed."  Do you see that?  A What page are you on?  Q No. 1, first few sentences.  A Yeah. One moment. Let me open it in my system viewer. This thing is terrible. I apologize.  Okay. Yeah, I have it now. First paragraph.  Q Yeah. I read the first three sentences.  A Okay.  Q Okay. Flip to page 4 of the PDF. Fourth paragraph down, starts with the words "The position." And let me know when you're with me.  Okay. You're with me. I'm going to read

51 (Pages 198 - 201)

Page 202			Page 204
1 1 measurements were recorded for rods 1, 2, 5, and	1	1	wrench.
2 2 6, using a 300 inch-pound maximum peak recording	2	2	BY MS. RATHKE:
3 3 torque wrench. Breakaway torque was measured	3	3	Q So the answer to the question, they're
4 4 during initial disassembly.	4	4	attempting to measure breakaway torque is
5 5 "After the breakaway torque was measured,	5	5	correct?
6 6 the torque required to return the nut to its	6	6	A Obviously they're looking for an undertorque
7 7 original position was also measured. In all	7	7	situation, so it's a different situation, as
8 8 instances the breakaway torque exceeded the	8	8	I've said before.
9 9 300 inch-pounds, 25 foot-pounds rated capacity	9	9	Q Can you show me where the word "undertorque"
10 10 of the wrench. Most of the return sorry	10	10	appears in Exhibit 99?
11 11 most of the return-to-position torque values	11	11	A The only logical conclusion that I can take from
12 12 also exceeded 300 inch-pounds."	12		this is they're looking at undertorque, because
13 13 Do you see that?	13	13	if they were looking for overtorque or anything
14 14 A Yes.	14	14	else, they would use a torque wrench that was
15 15 Q So is it fair to say that at least in this	15	15	appropriate for the specified torque on the
16 16 investigation, the NTSB uses breakaway torque to	16	16	bolt.
17 17 try to determine what the torque values were in	17		Q So your testimony is that breakaway torque is a
18 18 operation?	18	18	valid way of measuring an undertorque situation?
19 19 A Well, this is a different component, yes. And	19	19	A Breakaway torque can be valid for looking for a
20 20 as I said before, I've said numerous times, I	20		condition of undertorque. I mean, we see this
21 21 don't have a problem with it looking for a	21	21	all the time. We do it all the time.
22 22 condition of undertorque. It's just anything	22	22	A good example a good and simple example
23 23 that's been in service, you're not going to be	23	23	would be a wheel separation from a car. In that
24 24 able to determine if it's been overtorqued.	24	24	particular instance, you're looking for evidence
25	25		
Page 203			Page 205
1 1 Q In Exhibit 99	1	1	of undertorque all the time because it's not
2 2 A It also lists here that the torque for the rod	2	2	uncommon for an installer to do it, undertorque
3 3 bolts is 40 foot-pounds, so I'm not surprised	3	3	them. And what you'll do is go and measure the
4 4 they're not getting anywhere with a	4	4	torque, the breakaway torque.
5 5 300 inch-pound wrench. So in this particular	5	5	If the breakaway torque let's say the
6 6 case they're talking about an undertorqued bolt.	6	6	specification was 100 foot-pounds, as an
7 7 Q Exhibit 99 simply measures the torque value,	7	7	example. We're just going to pull a number.
8 8 without reference to overtorque or undertorque,	8	8	And if we find the breakaway torque you know,
9 9 correct?	9	9	tightening breakaway torque is in the 90 to 150
10 10 A Well, it can't be measuring the actual torque	10	10	range, we're going to say it's okay.
11 11 value if the spec is 480 inch-pounds and they're	11	11	But I've had as a simple example, I've
12 12 measuring it with a 300 inch-pound wrench. To	12	12	had wheels that I know were torqued to
13 13 me, it doesn't mean anything.	13	13	100 foot-pounds that have taken over 200 to
14 14 Q Well, it means that they're measuring breakaway	14	14	break loose. It's the nature of a bolted joint.
15 15 torque, correct?	15	15	Q What a breakaway torque measurement produces is
16 16 MR. MARIANI: Objection. Asked and	16	16	an integer torque value, correct?
17 17 answered.	17	17	MR. MARIANI: Object to the form.
18 18 THE DEPONENT: They are trying to measure a	18	18	Incomplete hypothetical.
19 19 breakaway torque that's listed higher than a	19	19	You can answer.
20 20 torque wrench they're using.	20	20	THE DEPONENT: Depending on the wrench.
21 21 MR. MARIANI: Asked and answered.	21	21	BY MS. RATHKE:
22 22 THE DEPONENT: The listed torque spec is	22	22	Q No matter what torque wrench you use, a
23 23 480 inch-pounds, and they're attempting to	23	23	breakaway torch measurement produces an integer
24 24 measure the torque using a 300 inch-pound torque	24	24	that is a torque value, correct?
			1 1
25	25		1

52 (Pages 202 - 205)

	Page 206			Page 208
1	1 MR. MARIANI: Same objection.	1	1	Verification torque is always measured in the
2	2 THE DEPONENT: Same answer.	2	2	tightening direction, and it usually exceeds the
3	3 BY MS. RATHKE:	3	3	maximum limit of the desired installation
4	4 Q What torque wrench does not produce an integer	4	4	torque.
5	5 torque value?	5	5	"It is normally used to, No. 1, break loose
6	6 A A digital one that reads in fractions of a	6	6	the net seizure effects before encountering the
7	7 foot inch-pound or foot-pound.	7	7	corrosive effects when the fastener assembly is
8	8 Q I see.	8	8	disassembled; No. 2, initially deform the
9	9 So a breakaway torque measurement produces	9	9	captive internal thread element on blind
10	a net value, correct?	10	10	fasteners with threaded cores; or No. 3, to
11	11 A It produces a	11	11	determine the magnitude of the installation
12	MR. MARIANI: Objection. Incomplete	12	12	torque after a given span of time after cyclic,
13	13 hypothetical.	13	13	thermal, or vibration loading, et cetera."
14	You can answer.	14	14	Correct?
15	15 BY MS. RATHKE:	15	15	A Yes. Yes, I agree with that. I read that.
16	16 Q Please answer.	16	16	Q All right.
17	17 A I said it produces a measured value.	17	17	A Just noting on that document that you note that
18	18 Q I've marked Exhibit 100 to your deposition,	18	18	that value is higher. Exceeds the maximum limit
19	which is a NASA document entitled Standard	19	19	of the desired installation torque. So that
20 2	Threaded Fasteners, Torque Limits For.	20	20	goes back to what I was talking about, related
21 2	Let me know when you've gotten it up.	21	21	to trying to make sure things are not
22 2	(Exhibit No. 100 marked.)	22	22	undertorqued.
23 2	THE DEPONENT: Is it a 486 document?	23	23	Q Have you ever seen the Pratt & Whitney drawings
24 2	24 \\\	24	24	for the diffuser bolt at issue in this case?
25		25		
	Page 207			Page 209
1	1 BY MS. RATHKE:	1	1	A I've seen the mill spec and the SAE drawings for
2	1 BY MS. RATHKE: 2 Q I don't know what you mean but a yes. Yes,	2	2	A I've seen the mill spec and the SAE drawings for them. They're in my report.
2 3	<ol> <li>BY MS. RATHKE:</li> <li>Q I don't know what you mean but a yes. Yes,</li> <li>it is.</li> </ol>	2 3	2	<ul><li>A I've seen the mill spec and the SAE drawings for them. They're in my report.</li><li>Q What is your basis to believe that the mill spec</li></ul>
2 3 4	<ol> <li>BY MS. RATHKE:</li> <li>Q I don't know what you mean but a yes. Yes,</li> <li>it is.</li> <li>A I'm going to use my own copy. But, yes.</li> </ol>	2 3 4	2 3 4	<ul> <li>A I've seen the mill spec and the SAE drawings for them. They're in my report.</li> <li>Q What is your basis to believe that the mill spec and the SAE spec are the binding specification</li> </ul>
2 3 4 5	<ol> <li>BY MS. RATHKE:</li> <li>Q I don't know what you mean but a yes. Yes,</li> <li>it is.</li> <li>A I'm going to use my own copy. But, yes.</li> <li>Q Is "verification torque" another word for</li> </ol>	2 3 4 5	2 3 4 5	<ul> <li>A I've seen the mill spec and the SAE drawings for them. They're in my report.</li> <li>Q What is your basis to believe that the mill spec and the SAE spec are the binding specification in this instance, rather than proprietary Pratt</li> </ul>
2 3 4 5 6	1 BY MS. RATHKE: 2 Q I don't know what you mean but a yes. Yes, 3 it is. 4 A I'm going to use my own copy. But, yes. 5 Q Is "verification torque" another word for 6 breakaway torque?	2 3 4 5 6	2 3 4 5 6	A I've seen the mill spec and the SAE drawings for them. They're in my report.  Q What is your basis to believe that the mill spec and the SAE spec are the binding specification in this instance, rather than proprietary Pratt & Whitney specification for use in aviation
2 3 4 5 6 7	<ol> <li>BY MS. RATHKE:</li> <li>Q I don't know what you mean but a yes. Yes,</li> <li>it is.</li> <li>A I'm going to use my own copy. But, yes.</li> <li>Q Is "verification torque" another word for breakaway torque?</li> <li>A One moment. Let me bring it up.</li> </ol>	2 3 4 5 6 7	2 3 4 5 6 7	A I've seen the mill spec and the SAE drawings for them. They're in my report.  Q What is your basis to believe that the mill spec and the SAE spec are the binding specification in this instance, rather than proprietary Pratt & Whitney specification for use in aviation settings?
2 3 4 5 6 7 8	1 BY MS. RATHKE: 2 Q I don't know what you mean but a yes. Yes, 3 it is. 4 A I'm going to use my own copy. But, yes. 5 Q Is "verification torque" another word for 6 breakaway torque? 7 A One moment. Let me bring it up. 8 You're referring to page 11 of that	2 3 4 5 6 7 8	2 3 4 5 6 7 8	A I've seen the mill spec and the SAE drawings for them. They're in my report.  Q What is your basis to believe that the mill spec and the SAE spec are the binding specification in this instance, rather than proprietary Pratt & Whitney specification for use in aviation settings?  MR. MARIANI: Objection to the form.
2 3 4 5 6 7 8 9	1 BY MS. RATHKE: 2 Q I don't know what you mean but a yes. Yes, 3 it is. 4 A I'm going to use my own copy. But, yes. 5 Q Is "verification torque" another word for 6 breakaway torque? 7 A One moment. Let me bring it up. 8 You're referring to page 11 of that 9 document, I'm assuming, on page 4 of the	2 3 4 5 6 7 8 9	2 3 4 5 6 7 8 9	A I've seen the mill spec and the SAE drawings for them. They're in my report.  Q What is your basis to believe that the mill spec and the SAE spec are the binding specification in this instance, rather than proprietary Pratt & Whitney specification for use in aviation settings?  MR. MARIANI: Objection to the form. You can answer.
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2 3 4 5 6 7 8 9 10	1 BY MS. RATHKE: 2 Q I don't know what you mean but a yes. Yes, 3 it is. 4 A I'm going to use my own copy. But, yes. 5 Q Is "verification torque" another word for 6 breakaway torque? 7 A One moment. Let me bring it up. 8 You're referring to page 11 of that 9 document, I'm assuming, on page 4 of the 10 document, page 11 of the PDF? 11 Q Yeah. Is "verification torque" another word for	2 3 4 5 6 7 8 9 10 11	2 3 4 5 6 7 8 9 10	A I've seen the mill spec and the SAE drawings for them. They're in my report.  Q What is your basis to believe that the mill spec and the SAE spec are the binding specification in this instance, rather than proprietary Pratt & Whitney specification for use in aviation settings?  MR. MARIANI: Objection to the form. You can answer.  THE DEPONENT: Because they're using a mill spec number and nomenclature system.
2 3 4 5 6 7 8 9 10 11	1 BY MS. RATHKE: 2 Q I don't know what you mean but a yes. Yes, 3 it is. 4 A I'm going to use my own copy. But, yes. 5 Q Is "verification torque" another word for 6 breakaway torque? 7 A One moment. Let me bring it up. 8 You're referring to page 11 of that 9 document, I'm assuming, on page 4 of the 10 document, page 11 of the PDF? 11 Q Yeah. Is "verification torque" another word for 12 breakaway torque?	2 3 4 5 6 7 8 9 10 11 12	2 3 4 5 6 7 8 9 10 11 12	A I've seen the mill spec and the SAE drawings for them. They're in my report.  Q What is your basis to believe that the mill spec and the SAE spec are the binding specification in this instance, rather than proprietary Pratt & Whitney specification for use in aviation settings?  MR. MARIANI: Objection to the form. You can answer.  THE DEPONENT: Because they're using a mill spec number and nomenclature system.  BY MS. RATHKE:
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2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	1 BY MS. RATHKE: 2 Q I don't know what you mean but a yes. Yes, 3 it is. 4 A I'm going to use my own copy. But, yes. 5 Q Is "verification torque" another word for 6 breakaway torque? 7 A One moment. Let me bring it up. 8 You're referring to page 11 of that 9 document, I'm assuming, on page 4 of the 10 document, page 11 of the PDF? 11 Q Yeah. Is "verification torque" another word for 12 breakaway torque? 13 A I'm reading this as I guess so. I've seen 14 this term used in here before, and I think it's 15 kind of a vague term because it's not a typical 16 industry term. But I suspect that's what 17 they're saying here.	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	A I've seen the mill spec and the SAE drawings for them. They're in my report.  Q What is your basis to believe that the mill spec and the SAE spec are the binding specification in this instance, rather than proprietary Pratt & Whitney specification for use in aviation settings?  MR. MARIANI: Objection to the form.  You can answer.  THE DEPONENT: Because they're using a mill spec number and nomenclature system.  BY MS. RATHKE:  Q Any other basis for your belief?  A No. That's what I need.  Q And have you seen any document showing Pratt & Whitney's own tolerance for these bolts?  A No. It's a commodity bolt, though. I mean, you
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	1 BY MS. RATHKE: 2 Q I don't know what you mean but a yes. Yes, 3 it is. 4 A I'm going to use my own copy. But, yes. 5 Q Is "verification torque" another word for 6 breakaway torque? 7 A One moment. Let me bring it up. 8 You're referring to page 11 of that 9 document, I'm assuming, on page 4 of the 10 document, page 11 of the PDF? 11 Q Yeah. Is "verification torque" another word for 12 breakaway torque? 13 A I'm reading this as I guess so. I've seen 14 this term used in here before, and I think it's 15 kind of a vague term because it's not a typical 16 industry term. But I suspect that's what 17 they're saying here. 18 Q And fair to say	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	A I've seen the mill spec and the SAE drawings for them. They're in my report.  Q What is your basis to believe that the mill spec and the SAE spec are the binding specification in this instance, rather than proprietary Pratt & Whitney specification for use in aviation settings?  MR. MARIANI: Objection to the form. You can answer.  THE DEPONENT: Because they're using a mill spec number and nomenclature system.  BY MS. RATHKE: Q Any other basis for your belief? A No. That's what I need. Q And have you seen any document showing Pratt & Whitney's own tolerance for these bolts? A No. It's a commodity bolt, though. I mean, you can buy it from any number of people. So I'm
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2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 22	1 BY MS. RATHKE: 2 Q I don't know what you mean but a yes. Yes, 3 it is. 4 A I'm going to use my own copy. But, yes. 5 Q Is "verification torque" another word for 6 breakaway torque? 7 A One moment. Let me bring it up. 8 You're referring to page 11 of that 9 document, I'm assuming, on page 4 of the 10 document, page 11 of the PDF? 11 Q Yeah. Is "verification torque" another word for 12 breakaway torque? 13 A I'm reading this as I guess so. I've seen 14 this term used in here before, and I think it's 15 kind of a vague term because it's not a typical 16 industry term. But I suspect that's what 17 they're saying here. 18 Q And fair to say 19 A On page 3 where they give that a definition as 10 well. 11 Q Fair to say that NASA defines, at least in 12 Exhibit 100, defines verification torque as: 13 "The torque required to initially move the	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	A I've seen the mill spec and the SAE drawings for them. They're in my report.  Q What is your basis to believe that the mill spec and the SAE spec are the binding specification in this instance, rather than proprietary Pratt & Whitney specification for use in aviation settings?  MR. MARIANI: Objection to the form. You can answer.  THE DEPONENT: Because they're using a mill spec number and nomenclature system.  BY MS. RATHKE: Q Any other basis for your belief? A No. That's what I need. Q And have you seen any document showing Pratt & Whitney's own tolerance for these bolts? A No. It's a commodity bolt, though. I mean, you can buy it from any number of people. So I'm sure it's the same. That's the SAE standard for the part number. Q How do you know that? A Because it says correctly on it, and it

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Page 210			Page 212
1 1 Q Well, what is the significance of that?		1	change any of your conclusions?
2 2 A That means it conforms with SAE or pardon me,	2		A No. No. The bolt was reused. I wouldn't
3 3 AS9696, which is an SAE standard. Or they're	3	3	expect it to go back the same way.
4 4 representing it to conform with that.	4	4	Q Are you aware that Pratt & Whitney's
5 5 Q Sure. But what is your evidence that Pratt &	5	5	instructions allow the use of turbine oil as a
6 6 Whitney doesn't have a proprietary standard	6	6	lubricant instead of Never-Seez?
7 7 where the tolerances are tighter?	7		A Regardless if they do, it's not the same as was
8 8 MR. MARIANI: Objection. Lack of	8	8	installed at the time it was administered and
9 9 foundation.	9	9	the threads have changed. It's irrelevant.
10 10 You can answer.	10		_
11 11 THE DEPONENT: Well, the bolts that I've	11		starting with the second sentence: "Images of
12 12 measured from service suggests that they're	12		
13 13 following the tolerance guidelines that are	13		clearly show that residual Never-Seez was
14 14 outlined in the standard.	14		•
15 15 BY MS. RATHKE:	15		bolt was installed by Dallas Airmotive during
16 16 Q Yes. They're within those guidelines, yes.	16		·
17 17 But what's your understanding that Pratt &	17		bolt, the residual Never-Seez that was present
18 18 Whitney doesn't have independent tolerances for	18		-
19 19 these bolts that are used in the aviation	19		
20 20 application?	20		•
21 21 A They're only aviation application bolts.	21		A Yes.
22 22 Q They're military application bolts.	22	22	Q And that is what you attempted to depict in
23 23 A Aerospace application. AS, aerospace. That's	23		• • •
24 24 the standard.	24	24	
25	25		
Page 211			Page 213
1 1 Q After removing engine 687 Bolt 15, Mr. Meyers	1	1	A That's a different bolt.
2 2 marked where the bolt had been when it was fully	2	2	Q Correct. Why would you if you're discussing
3 3 torqued and reinserted it into the diffuser and	3	3	Mr. Meyers and his treatment of Bolt 15 from
4 4 torqued it to 30 inch-pounds and 74 inch-pounds,	4	4	engine 687, why would you include a picture of
5 5 and noted that it still had not reached the	-	_	
I.	5	5	Bolt 3 to illustrate that?
6 6 original installation mark.		5 6	Bolt 3 to illustrate that?  MR. MARIANI: Objection.
	6		
6 6 original installation mark.	6	6 7	MR. MARIANI: Objection.
6 6 original installation mark. 7 7 Your report in Exhibit 91 indicates that	6 7	6 7 8	MR. MARIANI: Objection. THE DEPONENT: Probably
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6 6 original installation mark. 7 7 Your report in Exhibit 91 indicates that 8 8 this test is not valid because the bolt had old 9 9 Never-Seez on it and because Mr. Meyers had used 10 10 turbine oil as a lubricant and because you	6 7 8 9 10	6 7 8 9 10	MR. MARIANI: Objection. THE DEPONENT: Probably MR. MARIANI: Excuse me. Objection. Misstates the report. You can answer.
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6 6 original installation mark. 7 7 Your report in Exhibit 91 indicates that 8 8 this test is not valid because the bolt had old 9 9 Never-Seez on it and because Mr. Meyers had used 10 10 turbine oil as a lubricant and because you 11 11 believe he did not clean it, correct? 12 12 A Correct.	6 7 8 9 10 11 12 13	6 7 8 9 10 11 12	MR. MARIANI: Objection.  THE DEPONENT: Probably  MR. MARIANI: Excuse me. Objection.  Misstates the report.  You can answer.  THE DEPONENT: Probably because the image in 26 was a clear image and easier for a reader
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6 6 original installation mark. 7 7 Your report in Exhibit 91 indicates that 8 8 this test is not valid because the bolt had old 9 9 Never-Seez on it and because Mr. Meyers had used 10 10 turbine oil as a lubricant and because you 11 11 believe he did not clean it, correct? 12 12 A Correct. 13 13 Q Page 36 of your report, Exhibit 91, first 14 14 paragraph, second sentence indicates: "After 15 15 removal, the bolt was not cleaned, coated with 16 16 an unknown grade of turbine oil, and reinstalled 17 17 to 30 inch-pounds of applied torque." 18 18 Where did you get the information that the 19 19 bolt was not cleaned? 20 20 A It wasn't registered in his report, and I 21 21 believe I examined the bolt afterwards at Fusion 22 22 Engineering.	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	MR. MARIANI: Objection. THE DEPONENT: Probably MR. MARIANI: Excuse me. Objection. Misstates the report. You can answer. THE DEPONENT: Probably because the image in 26 was a clear image and easier for a reader to understand what I was speaking about. BY MS. RATHKE: Q Do you have photographs that purport to show that Bolt 15 has residual Never-Seez on the threads? A I will find it. Yes, I do. Q Does that does your photograph have a Bates label or any other identifying information? A Yes. I don't know the Bates number for it, but

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Page 214			Page 216
1 1 bolt inspection 120, 2020 Kea.	1	1	30 inch-pounds due to the greater stretch
2 2 Q And was the inclusion of the photograph of	2	2	developed in the bolt because of the difference
3 3 Bolt 3 in Figure 26, was that an accident or was	3	3	in TCE, thermal efficient expansion, between the
4 4 that intentional?	4	4	materials.
5 5 A No. Like I said, it just was a little bit more	5	5	"The effect of the assembly temperature may
6 6 clearer. And I also wanted to show what the	6	6	also have a large influence in the marking
7 7 Never-Seez looked like before it was had oil	7	7	method employed by Mr. Meyers on Bolt 15 of
8 8 put on it by Mr. Meyers in his test.	8	8	engine DA687, yet it was not considered in his
9 9 Q Page 38 of your report, which is Exhibit 91.	9	9	analysis."
10 10 You also criticize Mr. Meyers' marking analysis	10		First question is: Did you run this
11 11 with reference to the diffuser assembly	11		paragraph by anyone at Dallas Airmotive before
12 12 conditions and in particular with the fact that	12		putting it into your report and specific
13 13 the diffuser is heated before the final	13		well, let's just stop there.
14 14 assembly, and the difference	14		Did anybody from Dallas Airmotive review
15 15 A One moment, please.	15		that paragraph?
16 16 Sorry. Can you refer me I was trying to			A I don't know. Not that I recall. Maybe after I
17 17 find my report again.	17		wrote the report.
18 18 Q 38.			Q To your knowledge, did anybody from Dallas
19 19 A Page 38?	19		Airmotive vet or review the theory that after
20 20 Q Yep.	20		the diffuser cools during the assembly process,
21 21 A Give me one moment to close some documents here	21	21	the bolts will be overtorqued rather than
22 22 I've got so many open I can't find out where I'm	22		undertorqued?
23 23 at anymore.			A No. I said it's a possibility.
24 24 Q Okay.			Q Okay.
25	25		,
Page 215			Page 217
1 1 A So Exhibit 91, page 38?	1	1	A As I said, if the bolt comes up to temperature
2 2 Q Yep. Probably 39 of the PDF.	2	2	of the housing, you're going to run into that
3 3 A Yes.	3	3	condition.
4 4 Okay. I'm sorry. Go ahead.	4		Q All right. Do you have
5 5 Q All right. Here you're criticizing Mr. Meyers'	5		A I didn't run any experiments to see how that
	5		
<ul> <li>5 Q All right. Here you're criticizing Mr. Meyers'</li> <li>6 6 marking analysis with regard to the fact that</li> <li>7 7 the diffuser is heated before final assembly and</li> </ul>	5 6 7	5 6 7	A I didn't run any experiments to see how that effects breakaway torque, let alone the temperature and vibration effects that have been
<ul> <li>5 Q All right. Here you're criticizing Mr. Meyers'</li> <li>6 6 marking analysis with regard to the fact that</li> <li>7 7 the diffuser is heated before final assembly and</li> <li>8 8 the difference in thermal coefficient of</li> </ul>	5 6 7	5 6	A I didn't run any experiments to see how that effects breakaway torque, let alone the
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55 (Pages 214 - 217)

Page 218		Page 220
1 1 getting into statistical failure.	1 1	torque.
2 2 What if Pratt & Whitney does it a little	2 2	And especially if for instance, if this
3 3 bit faster or a little bit slower than Dallas	3 3	was the steel housing, if this was the steel
4 4 Airmotive, you may be getting different preloads	4 4	housing with the Waspoly bolt, I believe you'd
5 5 on those bolts. We don't know. You don't know,	5 5	be looking at a different situation, so you
6 6 neither do I. And neither does Mr. Meyers.	6 6	would want to verify that you maintain torque
7 7 Q Well, did you run by Dallas Airmotive the theory	7 7	because of the TCE differences in those
8 8 that as a result of the heating in the assembly	8 8	materials.
9 9 process, it's even possible, it's physically	9 9	Q 400 degrees Fahrenheit is not an extremely high
10 10 possible that the bolts at the end of that	10 10	temperature. Is that a fair characterization?
11 11 process will be overtorqued?	11 11	MR. MARIANI: Objection of the form.
12 12 A I didn't say overtorqued. I said the preload	12 12	THE DEPONENT: It's a relative extremely
13 13 would change.	13 13	high relative to the sun? Relative to room
14 14 Q Do you know why the diffuser assembly is heated	14 14	temperature?
15 15 prior to reinstallation?	15 15	BY MS. RATHKE:
16 16 A I think it has to get a bearings assembly in	16 16	Q Relative to, you know, moving metal.
17 17 place.	17 17	MR. MARIANI: Objection of the form.
18 18 Q And what do you mean by that?	18 18	THE DEPONENT: Moving metal, you're talking
19 19 A I think you have to heat it. I don't recall	19 19	about 5 microinches 5 to 7 microinches per
20 20 exactly, but I believe heating it has to do with	20 20	degree. That's real. That's a span from
21 21 lining it up with the bearing assembly, that	21 21	400F let's say 75 to 400F. That's
22 22 it the No. 4 bearing assembly that it rides	22 22	325 degrees. 325 microinches. That's more than
23 23 over.	23 23	a thousandth of an inch.
24 24 Q And do you have any data concerning the	24 24	
25	25	
Page 219		Page 221
1 1 temperature of the diffuser bolts during the	1 1	BY MS. RATHKE:
2 2 reassembly process?	2 2	
3 3 A No. The data I have says take it out of the	3 3	correct?
4 4 oven, put the bolts in, and then put it together	4 4	A Yes.
5 5 after you lower it in.		Q All right. You had some comments on Dr. Baron's
6 6 Q And I take it you've never observed the	6 6	report as well, correct?
7 7 installation of a diffuser?		A No. I want to quantify something first.
8 8 A No.	8 8	If we were to assume that bolt was exposed
9 9 Q And I take it also that you never discussed that	9 9	to 400 degrees when it was from room
10 10 process with any Dallas Airmotive mechanic or	10 10	temperature, it would grow by three-thousandths
11 11 any other Dallas Airmotive employee?	11 11	of an inch. That is more than the stretch
12 12 A No. I discussed how they put it together.	12 12	required on the bolt for the torque range.
13 13 Q With whom?	13 13	
14 14 A With Ian Cheyne and John Fallor.	14 14	heats to you understand that Pratt & Whitney
15 15 Q And specifically what did you discuss?	15 15	does not instruct anybody to heat the bolts,
16 16 A I wanted to confirm that they heated up and then	16 16	correct?
17 17 put the bolts in it before they assemble it.		A No. They instruct the user the overhaul to
18 18 Q And do you have an understanding as to why the	18 18	put the bolt into the hot surface.
19 19 bolts are torqued twice?	19 19	•
20 20 A Well, you want to verify your torque when it	20 20	temperature of 400 degrees Fahrenheit during
21 21 cools down. That's pretty common. If you're	21 21	that process?
		A I don't know.
22 22 putting something together that's been heated	22 22	
<ul><li>22 22 putting something together that's been heated</li><li>23 23 and it's going to sit at room temperature, it's</li></ul>	23 23	Q Well, does it seem particularly likely that the
22 22 putting something together that's been heated		

56 (Pages 218 - 221)

	Page 222			Page 224
1 1	MR. MARIANI: Objection. Calls for	1	1	to what's been marked as Exhibit 101.
2 2	speculation.	2	2	(Exhibit No. 101 marked.)
3 3	THE DEPONENT: I wouldn't be surprised if	3	3	MS. RATHKE: Hopefully it's there.
4 4	they reach 250 or 300. I don't know that they	4	4	MR. MARIANI: I'm only up to 100.
5 5	would reach 400.	5	5	MS. RATHKE: Well, you got to refresh.
6 6	BY MS. RATHKE:	6	6	MR. MARIANI: I did.
	Q Okay. Thank you.	7	7	MS. RATHKE: I'm asking the guy with
8 8	All right. Now, studying page 39 of	8	8	Internet service.
9 9	Exhibit 91, you offer your thoughts concerning		9	THE DEPONENT: I don't have 100. Mine ends
10 10	Dr. Baron's report; fair?	10		at 100 right now, Sarah.
	A 39?	11		MR. MARIANI: Yep. Same problem.
	Q Page 39 of your report.	12		MS. RATHKE: Now it's working. All right.
	A Yes.	13		THE DEPONENT: Try again?
	Q Actually, go to page 43 of Exhibit 91, where	14		MS. RATHKE: Yep. Try again.
15 15	we've got Figure 32.	15		Do you see a little photo?
	A Okay.	16		MR. MARIANI: Yep.
	Q All right. You've got an arrow pointing to	17		THE DEPONENT: Yeah. I'm trying to.
18 18				BY MS. RATHKE:
	something you call Possible Striations.  A Yes.	18		
				Q If you hover over the box, there's a series of
	Q Why do you think that it's merely possible	20		three round things on the lower right-hand side
21 21	rather than that they are striations?	21		of the exhibit box. The top one is, like, a
	A Because they could be just they could be	22		geometric situation. And if you hover over
23 23	evidence of propagation marks. I think it's	23		that, it says "fit to page." Hit the button
24 24	evidence of fatigue. I just didn't want to say	24	24	that says "fit to page."
25		25		
	Page 223			Page 225
1 1	it's definitely a striation or moreover a	1		A I just opened it in my system viewer.
2 2	propagation mark.			Q All right. Exhibit 101 is a 2,500-time
	Q Okay. What's the largest magnification at which	3		magnification of the area in the question that
4 4	you viewed the photograph depicted in 32 of	4		
5 5	Exhibit 91?			you're pointing to in your Figure 32.
6 6		5	5	Does that make sense to you?
	A It's exhibited at 1,000X.		5 6	Does that make sense to you?  A Yes.
7 7	MS. RATHKE: Okay. Let me	6 7	5 6 7	Does that make sense to you?  A Yes.  Q And let me ask if Exhibit 101 helps resolve
7 7 8 8	MS. RATHKE: Okay. Let me (Discussion off the record.)	6	5 6 7	Does that make sense to you?  A Yes.  Q And let me ask if Exhibit 101 helps resolve whether the sort of parallel up and down lines
	MS. RATHKE: Okay. Let me	6 7 8	5 6 7	Does that make sense to you?  A Yes.  Q And let me ask if Exhibit 101 helps resolve whether the sort of parallel up and down lines indicated kind of in the middle of the exhibit,
8 8	MS. RATHKE: Okay. Let me (Discussion off the record.)  MS. RATHKE: Let's take five now. I don't expect a huge amount of time after we're done	6 7 8 9 10	5 6 7 8 9 10	Does that make sense to you?  A Yes.  Q And let me ask if Exhibit 101 helps resolve whether the sort of parallel up and down lines indicated kind of in the middle of the exhibit, whether those, in fact, are striations?
8 8 9 9	MS. RATHKE: Okay. Let me (Discussion off the record.) MS. RATHKE: Let's take five now. I don't	6 7 8 9 10	5 6 7 8 9 10	Does that make sense to you?  A Yes.  Q And let me ask if Exhibit 101 helps resolve whether the sort of parallel up and down lines indicated kind of in the middle of the exhibit,
8 8 9 9 10 10	MS. RATHKE: Okay. Let me (Discussion off the record.)  MS. RATHKE: Let's take five now. I don't expect a huge amount of time after we're done I mean, after we come back. So let's take five.	6 7 8 9 10 11	5 6 7 8 9 10	Does that make sense to you?  A Yes.  Q And let me ask if Exhibit 101 helps resolve whether the sort of parallel up and down lines indicated kind of in the middle of the exhibit, whether those, in fact, are striations?
8 8 9 9 10 10 11 11	MS. RATHKE: Okay. Let me (Discussion off the record.) MS. RATHKE: Let's take five now. I don't expect a huge amount of time after we're done I mean, after we come back. So let's take five. THE DEPONENT: Can you give me 10? Just	6 7 8 9 10 11 12	5 6 7 8 9 10 11	Does that make sense to you?  A Yes.  Q And let me ask if Exhibit 101 helps resolve whether the sort of parallel up and down lines indicated kind of in the middle of the exhibit, whether those, in fact, are striations?  A Again, I've looked at this photo in the past.
8 8 9 9 10 10 11 11 12 12	MS. RATHKE: Okay. Let me (Discussion off the record.) MS. RATHKE: Let's take five now. I don't expect a huge amount of time after we're done I mean, after we come back. So let's take five. THE DEPONENT: Can you give me 10? Just because I got to run, do something real quick.	6 7 8 9 10 11 12 13	5 6 7 8 9 10 11 12	Does that make sense to you?  A Yes.  Q And let me ask if Exhibit 101 helps resolve whether the sort of parallel up and down lines indicated kind of in the middle of the exhibit, whether those, in fact, are striations?  A Again, I've looked at this photo in the past. I'm not going to comment on it, whether it's a
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8 8 9 9 10 10 11 11 12 12 13 13 14 14 15 15 16 16 17 17 18 18 19 19	MS. RATHKE: Okay. Let me (Discussion off the record.) MS. RATHKE: Let's take five now. I don't expect a huge amount of time after we're done I mean, after we come back. So let's take five. THE DEPONENT: Can you give me 10? Just because I got to run, do something real quick. Thank you. MS. RATHKE: You bet. (Break.) BY MS. RATHKE: Q All right. So I've marked what should we were talking about Figure 32 on page 43 of your expert report marked as Exhibit 91. My question	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	Does that make sense to you?  A Yes.  Q And let me ask if Exhibit 101 helps resolve whether the sort of parallel up and down lines indicated kind of in the middle of the exhibit, whether those, in fact, are striations?  A Again, I've looked at this photo in the past. I'm not going to comment on it, whether it's a striation or progression mark. Either way to me it is an indication of fatigue.  Q Did you observe any parallel noncritical cracks in the surface layer of the bolts that would be consistent with the notion that the surface area of these bolts is inherently brittle?  A Well, if you go back to the previous image on my Figure 32 could you repeat your question? I
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8 8 9 9 10 10 11 11 12 12 13 13 14 14 15 15 16 16 17 17 18 18 19 19 20 20 21 21	MS. RATHKE: Okay. Let me (Discussion off the record.) MS. RATHKE: Let's take five now. I don't expect a huge amount of time after we're done I mean, after we come back. So let's take five. THE DEPONENT: Can you give me 10? Just because I got to run, do something real quick. Thank you. MS. RATHKE: You bet. (Break.) BY MS. RATHKE: Q All right. So I've marked what should we were talking about Figure 32 on page 43 of your expert report marked as Exhibit 91. My question is if you've blown that up in magnification, I need to see if you can determine whether what	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	Does that make sense to you?  A Yes.  Q And let me ask if Exhibit 101 helps resolve whether the sort of parallel up and down lines indicated kind of in the middle of the exhibit, whether those, in fact, are striations?  A Again, I've looked at this photo in the past. I'm not going to comment on it, whether it's a striation or progression mark. Either way to me it is an indication of fatigue.  Q Did you observe any parallel noncritical cracks in the surface layer of the bolts that would be consistent with the notion that the surface area of these bolts is inherently brittle?  A Well, if you go back to the previous image on my Figure 32 could you repeat your question? I want to make sure I'm answering the question that you asked me.
8 8 9 9 10 10 11 11 12 12 13 13 14 14 15 15 16 16 17 17 18 18 19 19 20 20 21 21 22 22	MS. RATHKE: Okay. Let me (Discussion off the record.)  MS. RATHKE: Let's take five now. I don't expect a huge amount of time after we're done I mean, after we come back. So let's take five.  THE DEPONENT: Can you give me 10? Just because I got to run, do something real quick.  Thank you.  MS. RATHKE: You bet. (Break.)  BY MS. RATHKE:  Q All right. So I've marked what should we were talking about Figure 32 on page 43 of your expert report marked as Exhibit 91. My question is if you've blown that up in magnification, I need to see if you can determine whether what you've indicated as possible striations are, in	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	Does that make sense to you?  A Yes.  Q And let me ask if Exhibit 101 helps resolve whether the sort of parallel up and down lines indicated kind of in the middle of the exhibit, whether those, in fact, are striations?  A Again, I've looked at this photo in the past.  I'm not going to comment on it, whether it's a striation or progression mark. Either way to me it is an indication of fatigue.  Q Did you observe any parallel noncritical cracks in the surface layer of the bolts that would be consistent with the notion that the surface area of these bolts is inherently brittle?  A Well, if you go back to the previous image on my Figure 32 could you repeat your question? I want to make sure I'm answering the question that you asked me.

57 (Pages 222 - 225)

D 200	D 00
Page 226  1 1 really relating to your oxidation point.	Page 22 1 1 MR. MARIANI: Objection. Form. Incomplete
2 2 Did you observe any noncritical cracks in	2 2 hypothetical.
3 3 the surface layer of the bolts that would be	3 3 THE DEPONENT: Off the top of my head, no.
4 4 consistent with the notion that the surface area	4 4 I think it depends on the amount of usage. In
5 5 of these bolts is inherently brittle?	5 5 any regard, the torque wrenches that I used were
6 6 A I saw evidence of cracking in the thread root	6 6 brand-new and the first time they were ever used
7 7 and all of the all of the secondary cracks I	7 7 after their calibration were for this testing.
8 8 would consider as noncritical because they did	8 8 BY MS. RATHKE:
9 9 not progress to failure.	9 9 Q Exhibit 103 should come up on your screen.
10 10 Q All right. And in page 49 of your report, you	10 10 (Exhibit No. 103 marked.)
11 11 reference an SAE standard, specifically SAE	11 11 BY MS. RATHKE:
12 12 AS7471.	12 12 Q And I'll ask if you recognize Exhibit 103 as a
13 13 A Correct.	13 13 calibration document from your files.
14 14 Q And that you indicate is a standard that	14 14 A One moment. I'm waiting for it to load.
15 15 requires high-temperature oxides be removed from	15 15 Q You bet.
16 16 the bolt blanks prior to thread rolling, and the	16 16 A Yes.
17 17 presence of the high-temperature oxidation layer	17 17 Q The first page of Exhibit 103 pertains to a
18 18 is indicative of a manufacturing defect in the	18 18 50 foot-pound torque wrench that your shop uses,
19 19 subject bolts.	19 19 correct?
20 20 Do you see that?	20 20 A Yes.
21 21 A Yes.	21 21 Q And the reason that you produce this is because
22 22 Q You should see momentarily what's marked on your	
23 23 screen as Exhibit 102.	23 23 investigation in this case; fair statement?
24 24 (Exhibit No. 102 marked.)	24 24 A Correct. It was purchased for this case.
25	25
Page 227	Page 22
1 1 BY MS. RATHKE:	1 1 Q And when did you purchase torque wrenches for
1 1 BY MS. RATHKE: 2 2 Q And if you could just let me know, confirm one	1 1 Q And when did you purchase torque wrenches for 2 2 this case?
1 1 BY MS. RATHKE: 2 2 Q And if you could just let me know, confirm one 3 3 way or another, whether that is the same SAE	<ol> <li>1 Q And when did you purchase torque wrenches for</li> <li>2 this case?</li> <li>3 A I purchased it in January of 2020.</li> </ol>
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1 1 BY MS. RATHKE: 2 2 Q And if you could just let me know, confirm one 3 3 way or another, whether that is the same SAE 4 4 standard to which you are referring, that would 5 5 be great.	<ol> <li>1 Q And when did you purchase torque wrenches for</li> <li>2 this case?</li> <li>3 A I purchased it in January of 2020.</li> <li>4 Q Did you have torque wrenches in your possession</li> <li>5 before January 2020?</li> </ol>
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<ol> <li>BY MS. RATHKE:</li> <li>Q And if you could just let me know, confirm one</li> <li>way or another, whether that is the same SAE</li> <li>standard to which you are referring, that would</li> <li>be great.</li> <li>A Okay. Now it's not refreshing at all.</li> <li>Oh, there it goes.</li> <li>Q It's a bigger document so it will take a little</li> </ol>	<ol> <li>1 Q And when did you purchase torque wrenches for</li> <li>2 this case?</li> <li>3 A I purchased it in January of 2020.</li> <li>4 Q Did you have torque wrenches in your possession</li> <li>5 before January 2020?</li> <li>6 A I have several calibrated torque wrenches, but I</li> <li>7 did not have a torque wrench to cover the range</li> <li>8 that I needed for this particular application.</li> </ol>
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Page 23	Page 23
1 1 Q What is?	1 1 numbers so I know I was reproducing the torque
2 2 A The calibration date is from when it was	2 2 numbers correctly.
3 3 manufactured and then it sat on a shelf until	3 3 Q So after you purchased the new torque wrench
4 4 somebody purchased it. It was a brand-new	4 4 that to which Exhibit 103 pertains, grand
5 5 torque wrench.	5 5 total how many torque wrenches did you own?
6 6 Q All right.	6 6 A Do I own personally or through my business?
7 7 A The calibration date is probably from when it	7 7 Q Through your business.
8 8 was manufactured.	8 8 Did you buy 103 through your business or
9 9 Q Okay. So if I'm understanding you correctly,	9 9 did you buy it personally?
10 10 the calibration date for the brand-new torque	10 10 A No. I bought these through my business.
11 11 wrench that you bought was 11-12-2018, according	
12 12 to Exhibit 103?	12 12 wrenches. My business owns seven or eight.
13 13 A Correct.	13 13 Most of them are larger-style ones. We don't do
14 14 O Got it.	14 14 much on the small-bolt world. So like I said, I
15 15 Is Exhibit 103 the most recent calibration	15 15 wanted to get a low-end torque wrench.
16 16 certificate that you have for that particular	16 16 The only other torque wrench I have for
17 17 calibration wrench for that particular torque	17 17 doing small inch-pound measurements is actually
18 18 wrench?	18 18 a screwdriver style that does, like, 0 to
19 19 A Yes, because it was a brand-new torque wrench,	19 19 10 inch-pounds.
20 20 and it's not up for calibration. It won't be up	20 20 Q Okay. Have you read Mr. Cheyne's report?
21 21 for calibration on our end again until next	21 21 A Yes.
22 22 year. That's why there's an in-service date	22 22 Q I'm not going to burden the record too much by
23 23 below there on the specification. So it says	23 23 throwing in additional exhibits, but Mr. Cheyne
24 24 "One-year calibration integral recommended.	24 24 sets forth four factors in his report that he
25	25
Page 23	Page 23
1 1 User must determine the best interval date and	1 1 says in combination caused the diffuser bolts to
2 2 time and usage."	2 2 fail. And I'm going to ask if you agree with
3 Well, this was a brand-new torque wrench.	3 3 his words. Okay?
4 4 It was never used before 2020. So now we won't	4 4 A Can you tell me what part of the report are
5 5 be calibrating it for another year, or a year	5 5 you talking about his opinion on paragraph 15?
6 6 from January 2020. Actually, it'll be in our	6 6 Q Yes.
7 7 calibration log on our tool system in my office.	7 7 MR. MARIANI: Also, I'm going to object. I
8 8 Q And where did you buy it from?	8 8 don't have this document handy. So if you're
9 9 A I bought it from an online tool distributor.	9 9 not posting it, we'll have to wait until I can
10 10 PM MGGI I WI Z III I	bot posting it, we is have to wait until I can
10 10 Either MSC Industrial or Zoro. I don't remember	10 10 locate it elsewhere.
10 10 Either MSC Industrial or Zoro. 1 don't remember 11 11 which.	8 ,
	10 10 locate it elsewhere.
11 11 which.	10 10 locate it elsewhere.  11 11 Do you plan to introduce it or no?
<ul><li>11 11 which.</li><li>12 12 Q Why did you prefer not to use your I think</li></ul>	10 10 locate it elsewhere.  11 11 Do you plan to introduce it or no?  12 12 BY MS. RATHKE:
<ul> <li>11 11 which.</li> <li>12 12 Q Why did you prefer not to use your I think</li> <li>13 13 you called it a click-style torque wrench that</li> </ul>	10 10 locate it elsewhere.  11 11 Do you plan to introduce it or no?  12 12 BY MS. RATHKE:  13 13 Q Okay. If you look on your screen, Mr. Cheyne's
<ul> <li>11 11 which.</li> <li>12 12 Q Why did you prefer not to use your I think</li> <li>13 13 you called it a click-style torque wrench that</li> <li>14 14 you already had in your possession.</li> </ul>	10 10 locate it elsewhere.  11 11 Do you plan to introduce it or no?  12 12 BY MS. RATHKE:  13 13 Q Okay. If you look on your screen, Mr. Cheyne's  14 14 report is introduced as 104.
<ul> <li>11 11 which.</li> <li>12 12 Q Why did you prefer not to use your I think</li> <li>13 13 you called it a click-style torque wrench that</li> <li>14 14 you already had in your possession.</li> <li>15 15 A Well, I had another torque wrench that was a</li> </ul>	10 10 locate it elsewhere.  11 11 Do you plan to introduce it or no?  12 12 BY MS. RATHKE:  13 13 Q Okay. If you look on your screen, Mr. Cheyne's  14 14 report is introduced as 104.  15 15 Do you agree with that, Mr. Jones?
<ul> <li>11 11 which.</li> <li>12 12 Q Why did you prefer not to use your I think</li> <li>13 13 you called it a click-style torque wrench that</li> <li>14 14 you already had in your possession.</li> <li>15 15 A Well, I had another torque wrench that was a</li> <li>16 16 high-range inch-pound torque wrench that was a</li> </ul>	10 10 locate it elsewhere.  11 11 Do you plan to introduce it or no?  12 12 BY MS. RATHKE:  13 13 Q Okay. If you look on your screen, Mr. Cheyne's  14 14 report is introduced as 104.  15 15 Do you agree with that, Mr. Jones?  16 16 (Exhibit No. 104 marked.)
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<ul> <li>11 11 which.</li> <li>12 12 Q Why did you prefer not to use your I think</li> <li>13 13 you called it a click-style torque wrench that</li> <li>14 14 you already had in your possession.</li> <li>15 15 A Well, I had another torque wrench that was a</li> <li>16 16 high-range inch-pound torque wrench that was a</li> <li>17 17 click-style wrench, which it gives you a click.</li> <li>18 18 You set it and then it gives you a click when</li> </ul>	10 10 locate it elsewhere.  11 11 Do you plan to introduce it or no?  12 12 BY MS. RATHKE:  13 13 Q Okay. If you look on your screen, Mr. Cheyne's  14 14 report is introduced as 104.  15 15 Do you agree with that, Mr. Jones?  16 16 (Exhibit No. 104 marked.)  17 17 MR. MARIANI: I don't have the document  18 18 opened yet. So can you please wait a minute
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Page 234	Page 236
1 1 MR. MARIANI: I don't know what that has to	1 1 Mr. Jones, my name is Casey Suszynski, and
2 2 do with the courtesy of waiting for somebody to	2 2 I represent Textron in this matter.
3 3 open a document.	3 3 THE DEPONENT: Nice to meet you.
4 4 I've got it open. Please go ahead.	4 4 MS. SUSZYNSKI: You as well.
5 5 BY MS. RATHKE:	5 5 EXAMINATION
6 6 Q All right. Paragraph 15 of Mr. Cheyne's report,	6 6 BY MS. SUSZYNSKI:
7 7 which is now marked as Exhibit 104.	7 7 Q You testified that you aren't sure, but you
8 8 Are you with me, Mr. Jones?	8 8 think Textron may have manufactured the bolts at
9 9 A Yes.	9 9 issue; is that correct?
10 10 Q He states: "Based on my experience and a	10 10 A Yes.
11 11 thorough review of the evidence, it is most	11 11 Q Do you know offhand which part number you're
12 12 likely that a combination of factors caused the	12 12 referring to when you say that?
13 13 failure. A: Higher frictional forces when	13 13 A I'm thinking specifically of the nuts because I
14 14 installing used bolts in second- or third-run	14 14 purchased the nuts independently of receiving
15 15 engines led to a lower clamping force at the	15 15 them from Dallas Airmotive. And for some reason
16 16 specified torque."	16 16 when I looked up the part number on various
17 17 Agree or disagree?	17 17 websites, and I could be mistaken, but for some
18 18 A I agree with that opinion. That's my opinion as	18 18 reason I thought that they kept referencing it
19 19 well.	19 19 as a Textron bolt or a Textron nut.
20 20 Q "B: This combined with the known differential	20 20 Q You purchased nuts when did you purchase the
21 21 expansion of the parts during the required	21 21 nuts that you're referring to?
22 22 installation heating led to low preloads on the	22 22 A In January 2020.
23 23 bolts/joint."	23 23 Q And what's the part number of the nuts you
24 24 Agree or disagree?	24 24 purchased?
25	25
Page 235  1 1 A I think it's a possibility.	Page 237
1 1 A I think it's a possibility. 2 2 Q "C: The low preload joint clamping force then	2 2 Q Do you have receipts from that purchase?
3 3 led to loose bolts which allowed bolt vibration	3 3 A I'm sure they're somewhere in our artifacts.
4 4 in the assembly."	4 4 Q Would those receipts show if it was manufactured
5 5 Agree or disagree?	5 5 by Textron?
6 6 A I agree that the fatigue fractures were due to a	6 6 A I don't know. Let me see if I can find it.
7 7 lack of preload, not too much preload. Yes, I	7 7 Q Yeah. That would be great. Thank you.
8 8 agree with that statement, that low preload led	8 8 A Maybe I didn't buy them. Hold on one second.
9 9 to loose bolts which allowed vibration and which	9 9 Q Sure.
10 10 allowed them to fracture.	10 10 A I apologize. I don't have that handy.
11 11 Q You believe that the bolts, in fact, were loose?	11 11 Q Okay. And you stated as you were looking that
12 12 A They did not have sufficient preload.	12 12 you may not have even purchased the nuts now; is
13 13 Q "D: This, in turn, caused cracking at the	13 13 that correct?
14 14 thread roots adjacent to the first engaged	14 14 A No, no. I was looking at the wrong website. I
15 15 thread of the nuts with subsequent fatigue,	15 15 was looking at a different receipt for something
16 16 progression, and failure."	16 16 else.
17 17 Agree or disagree?	17 17 Q Okay. Do you recall actually buying the nuts in
18 18 A I agree with that statement.	18 18 January 2020?
19 19 MS. RATHKE: All right. I have no further	19 19 A Yes.
20 20 questions.	20 20 Q Okay. And, again
21 21 MS. SUSZYNSKI: I have a couple. Give me	21 21 A Easier way if you search online I think if
	1 22 22 11 11 11 6 14
22 22 just a second.	22 22 you search online you'll probably find it.
22 22 just a second. 23 23 THE DEPONENT: I'm sorry. Who is this?	23 23 Q Well, let me ask you this: The bolts at issue
22 22 just a second.	

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Page 238  1 1 sale in 2020, correct?  2 2 A I don't know when they were manufactured.  3 3 Q Well before 2020, correct?  4 4 A I would assume so but I don't know. Oh, you  Page 238  1 1 Q Mr. Jones, do you recall you were ask 2 2 questions early in the deposition about 3 3 background and experience? Do you recall you were ask 4 4 A Yes.	
2 2 A I don't know when they were manufactured. 3 3 Q Well before 2020, correct? 4 4 A I would assume so but I don't know. Oh, you 2 2 questions early in the deposition about 3 3 background and experience? Do you 1 4 4 A Yes.	
3 3 Q Well before 2020, correct? 3 3 background and experience? Do you r 4 4 A I would assume so but I don't know. Oh, you 4 4 A Yes.	ινουι
4 4 A I would assume so but I don't know. Oh, you 4 4 A Yes.	
5 5 mean the subject bolts, yes. 5 5 Q Can you tell me, do you have any firs	sthand
6 6 Q Correct. 6 6 experience doing mechanical work on	
7 7 Do you know when those were manufactured? 7 7 engines?	. 5 51
8 8 A No, I do not. You mean the subject bolts or the 8 8 A Yes. I worked at an engine assembly	business
9 9 bolts I tested? 9 9 that my family owned for many years.	
10 10 Q The subject bolts, sir. 10 10 at my family's truck dealership doing	
11 11 A No, I do not know when they were manufactured. 11 11 rebuilding and machining work. I also	
12 12 Q Do you know when the bolt 12 12 this day build racing engines for peop	
13 13 A Let me explain to you, probably help you out and 13 13 myself.	
14 14 make your life a little bit easier. 14 14 Q Okay. And when you say "racing en	ngines," can
15 15 Q I'll let you do that. 15 15 you tell us a little more what you're sp	
16 16 A If you go to some website and like I said, I  16 16 about.	, <i>U</i>
17 17 could be wrong, but if you go to some website 17 17 A Sure. I built many different I've bu	uilt even
18 18 and you push the part number for the nut in, it 18 18 custom engines. I've built V8s cut in	
19 19 will say I'm looking at a site right now 19 19 racing applications that are now V4s.	
20 20 called Air Power Inc. And it says right there, 20 20 presently building a 2-liter Honda that	
21 21 "Air frame parts, Continental Engine, Cessna 21 21 making approximately 350-horsepower	
22 22 part number ST6317-09 nut, self-lock shank." 22 22 aspirated. I've built probably in my li	fetime
23 23 And I think that may have been why I thought 23 23 over 300 automotive and diesel engine	
24 24 they were manufactured by Textron. 24 24 more.	
25	
Page 239	Page 241
1 1 Q Okay. But my why it doesn't make my life 1 1 Q Okay. And in the engines you've wor	rked on over
2 2 easier, sir, is because you have told us today 2 2 the years, both ones manufactured by 6	others as
3 3 that you think there's a manufacturing defect 3 3 well as ones you've built yourself, do y	you run
4 4 that contributed to the failure, correct? 4 4 into the issue of bolted joints and torqu	uing up
5 5 A I was referring to the bolts, not the nuts. 5 5 bolts in the engines?	
6 6 Q Okay. So you have no evidence to support any 6 6 A On a regular basis, engines automo	otive and
7 7 assertion that the bolts were manufactured by 7 7 diesel engines, just like jet turbine eng	ines,
8 8 Textron or Cessna? 8 8 also have a whole series of torque	
9 9 A I don't see evidence of that. 9 9 specifications and requirements that m	nust be
10 10 Q Okay. 10 10 followed.	
11 11 A The nut is what I and if I said that earlier, 11 11 Q Okay. And in this case, did you find	
12 12 I'm going to correct it right now because just 12 12 work that you were asked to undertake	
13 13 doing my quick Internet search while we've been 13 13 work involve principally the issue of a	a bolted
14 14 discussing this, it was the nut that I had 14 14 joint?	
15 15 purchased that I saw that the Textron lead to. 15 15 A Yes. My understanding was what	
16 16 Q Okay. Sir, do you have any opinion that the nut 16 16 retained to do was investigate the failu	
17 17 caused or contributed to the accident?   17 17 the bolt and the relationship to the join	nt, the
18 18 A No, ma'am, I do not. 18 18 bolted joint at issue here.	
19 19 MS. SUSZYNSKI: That's all I have, then. 19 19 Q And go ahead. I interrupted you.	
20 20 Thank you. 20 20 A No, no. Nothing.	
21 21 MR. MARIANI: I have some questions for the 21 21 Q Okay. And for purposes of your wor	
22 22 witness as well. 22 22 case, because this bolted joint happens	
	t vou've
23 23 EXAMINATION 23 23 an aircraft turbine engine, the fact that	-
	-

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1 1 aircraft turbine engine, did that affect your 2 2 ability in any way to examine this bolted joint? 3 3 A In this particular case, no. I mean, I've 4 4 worked on steam turbines and other types of 5 5 turbines that have been exposed to similar types 6 6 of operating conditions, temperature, you know, 7 7 issues with temperature, joint stiffness and 8 8 things of that nature in the past, let alone the 9 9 fact that we've been numerous have been 10 10 involved with, led, or participated in numerous 11 11 fatigue investigations over the years. 12 12 And to that note, I would just add to that, 13 13 that in my experience, that most bolted joint 14 14 fatigue failures are related to insufficient 15 15 preload or joint design issues. I can't 16 16 personally think of a time in my career where 17 17 I've possibly I may have, but where I've 18 18 encountered a bolt that was overtorqued to the 19 19 point where it was cracked and led to a failure. 20 20 Q Okay. You were asked a number of questions 21 21 early by counsel about your experience with 22 22 aircraft accident investigation, aircraft safety 23 23 classes. Do you recall that line of 24 24 questioning?  1 1 BYMR. MARIANI: 2 2 Q You can answer. 3 3 A I was not aware of that. I restricted my 4 4 investigation to the technical issues. 5 5 Q Okay. Now, do you recall you were asked some 6 6 questions about the West Virginia engine 6 6 questions about the West Virginia engine 7 7 disassembly that occurred and protocol that was 8 provided in relation to that sorry. Let me 9 9 withdraw that for the moment. 10 10 Let me ask you about your information that 11 11 you have with regard to Pratt & Whitney and the 12 12 information that it disseminated regarding these 13 13 subject bolts. Are you aware of Pratt & Whitney 14 14 having put out some information in and around 15 15 the time that the Menard bolts were discovered 16 16 to be broken? 17 17 A I'm aware of the service bolt, and that was 18 published recommending replacement of the bolts on wing. 20 20 Q Okay	Page 242			Page 244
2 2 Q Vou can answer.  3 3 A In this particular case, no. I mean, I've  4 worked on steam turbines and other types of  5 b turbines that have been exposed to similar types  6 c of operating conditions, temperature, you know,  7 r issues with temperature, joint stiffness and  8 things of that nature in the past, let alone the  8 p of fact that we've been ammerous - have been  10 10 involved with, led, or participated in numerous  11 11 fatigue investigations over the years.  12 12 And to that note, I would just add to that,  13 13 that in my experience, that most bolted joint  14 14 fatigue failures are related to insufficient  15 15 preload or joint design issues. I can'  16 16 personally think of a time in my career where  18 18 encountered a bolt that was overtorqued to the  19 19 point where it was cracked and led to a failure.  20 20 Q Nay, You were asked some  4 4 worked with, led, or participated in numerous  11 11 fatigue investigations over the years.  12 12 admits a preload or joint design issues. I can'  15 15 preload or joint design issues. I can'  16 16 personally think of a time in my career where  18 18 encountered a bolt that was overtorqued to the  19 19 point where it was cracked and led to a failure.  20 20 Q Nay, You were asked a number of questions  21 21 early by counsel about your experience with  22 22 aircraft accident investigation, aircraft safety  22 22 aircraft accident investigation, micraft safety  23 2 classes. Do you recall that line of  24 24 questioning?  24 24 questioning?  25 2 Q Is it your understanding. My understanding, the  26 4 A Thar's my understanding. My understanding, the  27 2 Q Is it your understanding. My understanding, the  28 3 A Thas' my understanding.  29 9 Q Was there any aircraft accident from you to  20 Q Nay, Ov you read lMs. Rathke was asking you  21 11 A Not that I'm aware of.  22 2 MS. RATHKE: Object to foundation.  23 23 Ms. RATHKE: Object to foundation.  24 24 of of on the subject engines, whether it caused  25 17 17 Q And do you recall she asked you	_	1	1	
3 3 A I twas not aware of that. Irrestricted my 4 4 worked on steam turbines and other types of 5 turbines that have been exposed to similar types 6 6 of operating conditions, temperature, you know, 7 7 issues with temperature, joint stiffness and 8 8 things of that nature in the past, let alone the 9 9 fact that we've been numerous have been 10 10 invived with, led, or participated in numerous 11 11 fatigue investigations over the years. 12 12 And to that note, I would just add to that, 13 13 that in my experience, that most botted joint 14 14 fatigue failures are related to insufficient 15 15 preload or joint design issues. I can't 16 16 personally think of a time in my career where 17 17 I've possibly I may have, but where I've 18 18 encountered a bolt that was overtorqued to the 19 19 point where it was cracked and led to a failure. 20 20 Q Okay. You were asked a number of questions 21 21 early by counsed about your experience with 22 22 aircraft accident investigation, aircraft safety 22 22 distrast my understanding in this case, there was 3 3 no accident or crash; is that correct? 4 4 A That's my understanding. My understanding, the 5 5 bolts were found broken; is that right? 8 8 A That's my understanding. My understanding, the 5 5 bolts were found broken; is that right? 8 8 A That's my understanding. My understanding, the 5 15 do not be subject engines, whether it caused 6 A Yes. 1 1 A Yes. 2 12 Q Okay. Do you recall sha sked you about whether 1 14 A Not that I'm aware of. 1 15 do not be subject engines, whether it caused 1 16 A Yes. 2 17 Q And do you recall sha sked you about whether 1 18 B combustion liner sustained some dents? 1 19 Q Okay. Do you aware that Menard's in this case has 1 10 10 Q Okay. Let me show you what we've marked now 1 11 I work part of the stable to a failure. 2 2 2 Q Are you aware that Menard's in this case has 3 a mages on the engine? 3 3 A May 28. 4 4 MS RATHKE: Object to foundation. 4 3 A Way 28. 4 4 O You can look and see if that should be available to see that. 4 1 Q Yo	_	2	2	Q You can answer.
4 4 worked on steam turbines and other types of 5 5 turbines that have been exposed to similar types 6 6 of operating conditions, temperature, you know, 7 7 issues with temperature, joint stiffness and 8 8 things of that nature in the past, let allone the 9 9 fact that we've been numerous have been 10 10 involved with, led, or participated in numerous 11 11 fatgue investigations over the years. 12 12 And to that note, I would just add to that, 13 13 that in my experience, that most bolted joint 14 14 fatgue failures are related to insufficient 15 15 preload or joint design issues. I can't 16 16 personally think of a time in my career where 17 17 Peve possibly I may have, but where I've 18 18 encountered a bolt that was overtorqued to the 19 point where it was cracked and led to a failure. 20 20 Q Okay, You were asked a number of questions 21 21 early by counsel about your experience with 22 22 aircraft accident investigation, aircraft safety 23 23 classes. Do you recall that line of 24 24 questioning?  Page 243  1 1 A Yes. 2 Q Is it your understanding in this case, there was 3 a no accident or crash; is that correct? 4 A That's my understanding. 5 bolts were found during an inspection. 6 6 Q And the aircraft was on the ground when the 7 bolts were found during an inspection. 6 6 Q And the aircraft was on the ground when the 7 bolts were found during an inspection. 6 6 Q And the aircraft was on the ground when the 7 bolts were found during an inspection. 6 6 Q And the aircraft was on the ground when the 7 bolts were found other, is that right? 8 A That's my understanding. 9 9 Q Was there any aircraft accident froy ou to 10 investigate in this case? 11 11 A Not that I'm aware of. 12 12 Q Okay, Do you recall she asked you about whether a 18 18 combustion liner sustained some dents? 19 19 A Yes. 20 Q Q Arey on aware that Mennard's in this case has 18 18 combustion liner sustained some dents? 19 19 A Yes. 20 Q Q Arey any aware of Parts & Whitney and the information that it disseminated regarding thes a bubtle		3	3	A I was not aware of that. I restricted my
5 5 Q Okay, Now, do you recall you were asked some of operating conditions, temperature, you know, 7 7 issues with temperature, joint stiffness and 8 8 things of that nature in the past, let alone the 9 9 fact that we've been numerous – have been 10 10 involved with, led, or participated in numerous 11 11 fatigue investigations over the years. 10 10 Let me ask you about your information that 11 11 fatigue investigations over the years. 11 11 1 you have with regard to Pratt & Whitney and the 11 11 1 fatigue failures are related to insufficient 15 15 preload or joint design issues. I can't 16 16 personally think of a time in my career where 17 17 Pre – possibly may have, but where I've 18 18 encountered abolt that was overdroqued to the 19 point where it was cracked and led to a failure. 20 20 Q Okay. You were asked a number of questioned to the point where it was cracked and led to a failure. 21 21 early by counsel about your experience with 22 22 aircraft accident investigation, aircraft safety 23 23 classes. Do you recall that line of questioning? 24 24 questioning? 25 Page 24 24 4 A That's my understanding. My understanding, the 5 bolts were found during an inspection. 24 24 questioning of the aircraft was on the ground when the 5 bolts were found broken; is that correct? 25 Was A That's my understanding. My understanding, the 5 bolts were found during an inspection. 25 A Sorry. The lights just went off. 26 Q And the aircraft was on the ground when the 5 bolts were found during an inspection. 26 Q Was there any aircraft accident for you to 10 10 investigate in this case? 11 1 A Not that I'm aware of 6 Page 24 Ms. RATHKE: Object to foundation. 11 11 1 Not that I'm aware of 6 Page 24 Okay. Do you recall Ms. Rathke was asking you 11 11 A Not that I'm aware of 6 Q Vand the aircraft was on the ground when the 6 for on the subject engines, whether it caused 4 off on the subject engines, whether it caused 4 off on the subject engines, whether it caused 5 G A Vag. Do you recall Ms. Rathke was asking you 11 11 A Not t	_	4	4	•
7   Sissues with temperature, joint stiffness and   8   8   things of that nature in the past, let alone the   9   fact that we've been numerous - have been   10   10   involved with, led, or participated in numerous   11   11   fatigue investigations over the years.   11   11   fatigue investigations over the years.   12   12   And to that note, I would just add to that,   13   13   that in my experience, that most bolted joint   14   14   fatigue failures are related to insufficient   15   15   preload or joint design issues. I can't   16   16   personally think of a time in my career where   16   16   personally think of a time in my career where   18   18   encountered a bolt that was overtorqued to the   19   point where it was cracked and led to a failure,   20   20   Q (Nay. You were asked a number of questions   21   22   aircraft accident investigation, aircraft safety   22   23   aircraft accident investigation, aircraft safety   23   23   aclasses. Do you recall that line of   24   24   questioning?   24   24   4   A That's my understanding in this case, there was a   3   no accident or crash; is that correct?   4   A That's my understanding. My understanding, the   5   bolts were found dring an inspection.   25   26   Q   Is it your understanding. My understanding, the   5   bolts were found dring an inspection.   26   Q   Q   Q   Is your understanding. My understanding, the   5   bolts were found dring an inspection.   26   Q   Q   Q   Q   Q   Q   Q   Q   Q		5	5	
7   Sissues with temperature, joint stiffness and   8   8   things of that nature in the past, let alone the   9   fact that we've been numerous - have been   10   10   involved with, led, or participated in numerous   11   11   fatigue investigations over the years.   11   11   fatigue investigations over the years.   12   12   And to that note, I would just add to that,   13   13   that in my experience, that most bolted joint   14   14   fatigue failures are related to insufficient   15   15   preload or joint design issues. I can't   16   16   personally think of a time in my career where   16   16   personally think of a time in my career where   18   18   encountered a bolt that was overtorqued to the   19   point where it was cracked and led to a failure,   20   20   Q (Nay. You were asked a number of questions   21   22   aircraft accident investigation, aircraft safety   22   23   aircraft accident investigation, aircraft safety   23   23   aclasses. Do you recall that line of   24   24   questioning?   24   24   4   A That's my understanding in this case, there was a   3   no accident or crash; is that correct?   4   A That's my understanding. My understanding, the   5   bolts were found dring an inspection.   25   26   Q   Is it your understanding. My understanding, the   5   bolts were found dring an inspection.   26   Q   Q   Q   Is your understanding. My understanding, the   5   bolts were found dring an inspection.   26   Q   Q   Q   Q   Q   Q   Q   Q   Q		6	6	
8 8 things of that nature in the past, let alone the 9 9 fact that we've been numerous – have been 10 10 involved with, led, or participated in numerous 11 11 fatigue investigations over the years. 11 11 fatigue investigations over the years. 12 12 And to that note, I would just add to that, 13 13 that in my experience, that most bofted joint 14 14 fatigue failures are related to insufficient 15 15 preload or joint design issues. I can't 16 16 personally think of a time in my career where 17 17   I've – possibly I may have, but where I've 18 18 encountered a bolt that was overtorqued to the 19 19 point where it was cracked and led to a failure. 20 20   Q kay. You were asked a number of questions 21 21 early by counsel about your experience with 22 22 a varient accident investigation, aircraft astery 23 23 classes. Do you recall that line of 24 24 questioning? 25   Page 243   26		7	7	disassembly that occurred and protocol that was
10   10   involved with, led, or participated in numerous   11   11   fatigue investigations over the years.   11   12   12   12   13   13   that in my experience, that most bolted joint   14   14   fatigue failures are related to insufficient   15   15   for personally think of a time in my career where   16   16   personally think of a time in my career where   17   17   Pver - possibly I may have, but where I've   18   18   encountered a bott that was overtorqued to the   19   19   point where it was cracked and led to a failure.   20   20   Qokay. You were asked a number of questions   21   21   early by counsel about your experience with   19   22   23   classes. Do you recall that line of   23   23   classes. Do you recall that line of   24   24   questioning?   24   24   24   24   24   24   24   2	8 8 things of that nature in the past, let alone the	8	8	provided in relation to that sorry. Let me
11   11   fatigue investigations over the years.   12   2   And to that note, I would just add to that,   13   13   13   14   14   fatigue failures are related to insufficient   14   14   fatigue failures are related to insufficient   15   15   preload or joint design issues. I can't   16   16   personally think of a time in my career where   17   17   17   17   17   17   17   1	9 9 fact that we've been numerous have been	9	9	withdraw that for the moment.
12 12 And to that note, I would just add to that, 13 13 that in my experience, that most bolted joint 14 14 fatigue failures are related to insufficient 15 15 preload or joint design issues. I can't 16 16 personally think of a time in my career where 17 17 I've possibly I may have, but where I've 18 18 encountered a bolt that was overtorqued to the 19 19 point where it was cracked and led to a failure. 20 20 Q Okay. You were asked a number of questions 21 21 early by counsel about your experience with 22 22 aircraft accident investigation, aircraft safety 23 23 classes. Do you recall that line of 24 24 questioning? 25 2 Q Is it your understanding in this case, there was 2 3 3 no accident or crash; is that correct? 4 4 A That's my understanding. My understanding, the 5 5 bolts were found during an inspection. 6 6 Q And the aircraft was on the ground when the 7 7 bolts were found broken; is that right? 8 8 A That's my understanding. 9 9 Q Was there any aircraft accident for you to 10 10 investigate in this case? 11 11 A Not that Tm aware of. 12 12 Q Okay. Do you recall Ms. Rathke was asking you 13 13 questions about whether, when the bolts broke 14 14 off on the subject engines, whether it caused 15 15 damage to other parts in the engine? 16 16 A Yes. 17 17 Q And do you recall she asked you about whether a 18 18 (a combustion liner sustained some dents? 19 19 A Yes. 17 17 Q And do you recall she asked you about whether a 18 18 (a combustion liner sustained some dents? 19 19 A Yes. 17 17 Q And do you recall she asked you about whether a 18 18 (a combustion liner sustained some dents? 19 19 A Yes. 19 19 A Yes. 10 10 4 Yes, I have it. 10 10 5 A Yes. 11 11 A Not that Tm aware of. 11 11 A No	10 10 involved with, led, or participated in numerous	10	10	Let me ask you about your information that
13 13 that in my experience, that most bolted joint 14 14 fatigue failures are related to insufficient 15 15 preload or joint design issues. I can't 16 16 personally think of a time in my career where 17 17   Fve - possibly I may have, but where I've 18 18 encountered a bolt that was overtorqued to the 19 19 point where it was cracked and led to a failure. 20 20 Q Okay. You were asked a number of questions 21 21 early by counsel about your experience with 22 22 aircraft accident investigation, aircraft safety 23 23 classes. Do you recall that line of 24 24 questioning? 25   Page 243   26	11 11 fatigue investigations over the years.	11	11	you have with regard to Pratt & Whitney and the
14 14 fatigue failures are related to insufficient 15 15 preload or joint design issues. I can't 16 16 personally think of a time in my career where 17 17   Pve – possibly I may have, but where I've 18 18 encountered a bolt that was overtorqued to the 19 19 point where it was cracked and led to a failure. 20 20 Q Okay. You were asked a number of questions 21 21 early by counsel about your experience with 22 22 aircraft accident investigation, aircraft safety 23 23 classes. Do you recall that line of 24 24 questioning?  Page 243 1 I A Yes. 2 Q Is it your understanding in this case, there was 3 3 no accident or crash; is that correct? 4 4 A That's my understanding. My understanding, the 5 5 bolts were found during an inspection. 6 Q And the aircraft was on the ground when the 7 7 bolts were found broken; is that right? 8 8 A That's my understanding. 9 9 Q Was there any aircraft accident for you to 10 10 investigate in this case? 11 11 A Not that I'm aware of. 11 11 A Not that I'm aware of. 12 12 12 Q Okay. Do you recall Ms. Rathke was asking you 13 13 questions about whether, when the bolts broke 14 14 off on the subject engines, whether it caused 15 15 the time that the Menard bolts were discovered to to be broken? 17 17 A I'm aware of the service bolt, and that was 18 18 published recommending replacement of the bolts on owing. 20 Q Q And based on your experience and knowledge on your experience and knowledge on your experience and knowledge on wing. 21 21 parts of this nature, can you come up with any would recommend the replacement of the bolts on wing. 22 22 Is bit your understanding in this case, there was a solidal recommend the replacement of the bolts on wing if there was absolutely no problem with the 25	12 12 And to that note, I would just add to that,	12	12	information that it disseminated regarding these
15 15 preload or joint design issues. I can't 16 16 personally think of a time in my career where 17 17 I've – possibly I may have, but where I've 18 18 encountered a bolt that was overtorqued to the 19 19 point where it was cracked and led to a failure. 20 20 Q Okay. You were asked a number of questions 21 21 early by counsel about your experience with 22 22 aircraft accident investigation, aircraft safety 22 23 classes. Do you recall that line of 24 24 questioning? 24 24 questioning? 24 24 questioning? 25 25 25 25 26 27 26 27 27 28 29 Q Rad based on your experience and knowledge on 21 21 bolts? 22 22 explanation for why a manufacturer like this 23 23 an oa accident or crash; is that correct? 25 25 25 25 25 26 27 26 27 27 29 Q Rad the aircraft was on the ground when the 5 5 bolts were found broken; is that right? 4 A A That's my understanding. When the 5 5 bolts were found broken; is that right? 5 bolts were found broken; is that right? 7 bolts were found broken; is that right? 8 8 A That's my understanding. 8 8 8 A That's my understanding. 9 9 Q Was there any aircraft accident for you to 10 investigate in this case? 11 11 A Nott that I'm aware of. 12 12 Q Okay. Do you recall Ms. Rathke was asking you 13 13 questions about whether, when the bolts broke 14 14 off on the subject engines, whether it caused 15 15 damage to other parts in the engine? 16 16 A Yes. 17 Q And do you recall she asked you about whether a combustion liner sustained some dents? 18 18 published that it's not seeking damages for 22 22 anything in the case related to any other 23 23 23 damages on the engine? 24 24 Q What's your understanding about what Exhibit 105 before 24 24 Q What's your understanding about what Exhibit 105 understanding about what Exhibit 105 on a Marked. 19 19 A Yes. 14 A Yes	13 13 that in my experience, that most bolted joint	13	13	subject bolts. Are you aware of Pratt & Whitney
16   16   personally think of a time in my career where   17   17   17   17   17   17   17   1	14 14 fatigue failures are related to insufficient	14	14	having put out some information in and around
17   17   17   17   18   encountered a bolt that was overtorqued to the last encountered a bolt that was overtorqued to the last encountered a bolt that was overtorqued to the last encountered a bolt that was overtorqued to the last encountered a bolt that was overtorqued to the last encountered a bolt that was overtorqued to the last encountered a bolt that was overtorqued to the last encountered a bolt that was overtorqued to the last encountered a bolt that was overtorqued to the last encountered a bolt that was overtorqued to the last encountered a bolt that was overtorqued to the last encountered a bolt that was overtorqued to the last encountered a bolt that was overtorqued to the last encountered a bolt that was overtorqued to the last encountered a bolt that was overtorqued to the last encountered a bolt that was overtorqued to the last encountered a bolt that was overtorqued to the last encountered a bolt that was overtorqued to the last encountered a bolt that was overtorqued to the last encountered a bolt that was on wing if the service bolt, and that was published recommending replacement of the bolts on wing.  18 18	15 15 preload or joint design issues. I can't	15	15	the time that the Menard bolts were discovered
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19 19 point where it was cracked and led to a failure. 20 20 Q Okay. You were asked a number of questions 21 21 early by counsel about your experience with 22 22 aircraft accident investigation, aircraft safety 23 23 classes. Do you recall that line of 24 24 questioning?  Page 243  Page 243  1 1 A Yes. 2 2 Q Is it your understanding in this case, there was 3 3 no accident or crash; is that correct? 4 4 A That's my understanding. My understanding, the 5 5 bolts were found during an inspection. 6 6 Q And the aircraft was on the ground when the 7 7 bolts were found broken; is that right? 8 8 A That's my understanding. 9 9 Q Was there any aircraft accident for you to 10 10 investigate in this case? 11 1 A Not that I'm aware of. 12 12 Q Okay. Do you recall Ms. Rathke was asking you 13 13 questions about whether, when the bolts broke 14 14 off on the subject engines, whether it caused 15 15 damage to other parts in the engine? 16 16 A Yes. 17 17 Q And do you recall she asked you about whether a combustion liner sustained some dents? 19 19 A Yes. 20 Q Are you aware that Menard's in this case has 21 21 admitted that it's not seeking damages for 22 22 anything in the case related to any other 23 23 damages on the engine? 24 24 bond based on your experience and knowledge on 21 21 parts of this nature, can you come up with any 22 22 explanation for why a manufacturer like this 23 23 would recommend the replacement of the bolts on wing if there was absolutely no problem with the 25 bolts were found during an inspection. 3 3 BY MR. MARIANI: 4 4 Q You can answer. 5 5 A Sorry. The lights just went off. 6 6 No, I can't think of a reason other than 7 7 I can't think of a reason why they would 28 8 recommend replacing them on wing like that 4 9 unless there was a concern on their end. 10 10 Q Okay. Let me show you what we've marked now 11 11 Exhibit 105. 12 12 Q Okay. Oyou recall she asked you about whether a combustion liner sustained some dents? 11 11 Part A One moment. 11 12 Q Okay. And have you seen Exhibit 105 before 12	17 17 I've possibly I may have, but where I've	17	17	A I'm aware of the service bolt, and that was
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	Page 246			Page 248
1 1	is?	1	1	A Not in my experience.
2 2	MS. RATHKE: Object to foundation.	2	2	Q Do you recall that you were asked some questions
3 3	BY MR. MARIANI:	3	3	earlier about the location of certain Dallas
4 4	Q You can answer.	4	4	Airmotive records related to one of the three
5 5	A What I see here is that it says now to discard	5	5	engines in question?
6 6	the bolts from the gas generator diffuser	6	6	A Yes.
7 7	assembly. And if it says discard them, it must	7	7	Q Are you aware that the FAA requires repair
8 8	be implies that new bolts will be installed	8	8	companies, licensed repair companies like Dallas
9 9	upon assembly.	9	9	Airmotive, to retain records only for two years
10 10	Q And when you say "it says," what are you	10	10	post-overhaul?
11 11	referring to? What's your understanding about	11	11	A No.
12 12	where this data is coming from?	12	12	
13 13	B A Okay.	13	13	you when she asked you questions about where
14 14	MS. RATHKE: Same objection.	14	14	those records were?
15 15		15	15	A No.
16 16	3		16	
17 17		17	17	1 , 3
18 18		18	18	3
19 19	Q Okay. You can answer.	19	19	defect with respect to this oxide on the outside
20 20	•	20	20	
21 21	3,3	21	21	Do you recall that?
22 22	1 8		22	
23 23	•		23	
24 24	there's been a revision. And as you can see		24	disposal presently to tell you what percent of
25		25		
	Page 247			Page 249
1 1	there, it tells the overhauler to remove and	1	1	bolts installed in Pratt & Whitney 530A engines
1 1 2 2	there, it tells the overhauler to remove and discard the bolts from the diffuser assembly.	1 2	1 2	bolts installed in Pratt & Whitney 530A engines have that same manufacturing defect?
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2 2 3 3 4 4	there, it tells the overhauler to remove and discard the bolts from the diffuser assembly.  Q Okay. And is this information that my office provided to you?	2 3 4	2 3 4	bolts installed in Pratt & Whitney 530A engines have that same manufacturing defect?  A You mean encompassing all the engines?  Q Correct. All the Pratt & Whitney 530As that are
2 2 3 3 4 4 5 5	there, it tells the overhauler to remove and discard the bolts from the diffuser assembly.  Q Okay. And is this information that my office provided to you?  A Yes, it is.	2 3 4 5	2 3 4 5	bolts installed in Pratt & Whitney 530A engines have that same manufacturing defect?  A You mean encompassing all the engines?  Q Correct. All the Pratt & Whitney 530As that are out there operating.
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2 2 3 3 4 4 4 5 5 5 6 6 6 7 7 7 8 8 8 9 9 10 10 11 11 11 12 12 13 13 14 14 15 15 16 16 17 17 18 18 18 19 19	there, it tells the overhauler to remove and discard the bolts from the diffuser assembly.  Q Okay. And is this information that my office provided to you?  A Yes, it is.  Q Okay. And is it your what's your understanding as to the original source of this data?  A I believe it came from Pratt & Whitney as it looks like their manual.  Q And is what you see here in your is it your view that this is somehow related to the service instruction you were telling us about that came out earlier?  MS. RATHKE: Object to foundation.  BY MR. MARIANI:  Q Go ahead.  A It appears to be consistent with the service recommendation because now they're requiring it	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	bolts installed in Pratt & Whitney 530A engines have that same manufacturing defect?  A You mean encompassing all the engines?  Q Correct. All the Pratt & Whitney 530As that are out there operating.  Do you know of those that are out there operating what percentage of those have bolts installed in the diffuser that do have the manufacturing defect?  A No, I do not.  Q And do you recall a series of questions that Ms. Rathke asked you before regarding why it was, in your understanding, that there were a handful of engines that have been discovered, 530As with broken bolts, but all these other 530As are out there operating. They so far haven't been reported to have broken bolts.  Do you recall that line of questioning?  A Yes, I recall that.
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2 2 2 3 3 3 4 4 4 5 5 5 6 6 6 7 7 7 8 8 8 9 9 10 10 11 11 11 12 12 13 13 14 14 15 15 16 16 17 17 18 18 19 19 20 20 21 21 22 22	there, it tells the overhauler to remove and discard the bolts from the diffuser assembly.  Q Okay. And is this information that my office provided to you?  A Yes, it is.  Q Okay. And is it your what's your understanding as to the original source of this data?  A I believe it came from Pratt & Whitney as it looks like their manual.  Q And is what you see here in your is it your view that this is somehow related to the service instruction you were telling us about that came out earlier?  MS. RATHKE: Object to foundation.  BY MR. MARIANI:  Q Go ahead.  A It appears to be consistent with the service recommendation because now they're requiring it within the disassembly and overhaul manual.  Q In your experience, have you seen any instance where a manufacturer would require a change like	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	bolts installed in Pratt & Whitney 530A engines have that same manufacturing defect?  A You mean encompassing all the engines?  Q Correct. All the Pratt & Whitney 530As that are out there operating.  Do you know of those that are out there operating what percentage of those have bolts installed in the diffuser that do have the manufacturing defect?  A No, I do not.  Q And do you recall a series of questions that Ms. Rathke asked you before regarding why it was, in your understanding, that there were a handful of engines that have been discovered, 530As with broken bolts, but all these other 530As are out there operating. They so far haven't been reported to have broken bolts.  Do you recall that line of questioning?  A Yes, I recall that.  Q And how would this issue of the manufacturing defect on some but perhaps not all bolts, how would it relate to that topic?
2 2 2 3 3 3 4 4 4 5 5 5 6 6 6 6 7 7 7 8 8 8 9 9 10 10 11 11 11 12 12 13 13 14 14 15 15 16 16 17 17 18 18 18 19 19 20 20 21 21 21 22 22 23 23 23	there, it tells the overhauler to remove and discard the bolts from the diffuser assembly.  Q Okay. And is this information that my office provided to you?  A Yes, it is.  Q Okay. And is it your what's your understanding as to the original source of this data?  A I believe it came from Pratt & Whitney as it looks like their manual.  Q And is what you see here in your is it your view that this is somehow related to the service instruction you were telling us about that came out earlier?  MS. RATHKE: Object to foundation.  BY MR. MARIANI:  Q Go ahead.  A It appears to be consistent with the service recommendation because now they're requiring it within the disassembly and overhaul manual.  Q In your experience, have you seen any instance where a manufacturer would require a change like this when there's absolutely nothing wrong with	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	bolts installed in Pratt & Whitney 530A engines have that same manufacturing defect?  A You mean encompassing all the engines?  Q Correct. All the Pratt & Whitney 530As that are out there operating.  Do you know of those that are out there operating what percentage of those have bolts installed in the diffuser that do have the manufacturing defect?  A No, I do not.  Q And do you recall a series of questions that Ms. Rathke asked you before regarding why it was, in your understanding, that there were a handful of engines that have been discovered, 530As with broken bolts, but all these other 530As are out there operating. They so far haven't been reported to have broken bolts.  Do you recall that line of questioning?  A Yes, I recall that.  Q And how would this issue of the manufacturing defect on some but perhaps not all bolts, how would it relate to that topic?  A I'm sorry. Could you repeat that question
2 2 2 3 3 3 4 4 4 5 5 5 6 6 6 7 7 7 8 8 8 9 9 10 10 11 11 11 12 12 13 13 14 14 15 15 16 16 17 17 18 18 19 19 20 20 21 21 22 22	there, it tells the overhauler to remove and discard the bolts from the diffuser assembly.  Q Okay. And is this information that my office provided to you?  A Yes, it is.  Q Okay. And is it your what's your understanding as to the original source of this data?  A I believe it came from Pratt & Whitney as it looks like their manual.  Q And is what you see here in your is it your view that this is somehow related to the service instruction you were telling us about that came out earlier?  MS. RATHKE: Object to foundation.  BY MR. MARIANI:  Q Go ahead.  A It appears to be consistent with the service recommendation because now they're requiring it within the disassembly and overhaul manual.  Q In your experience, have you seen any instance where a manufacturer would require a change like this when there's absolutely nothing wrong with	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	bolts installed in Pratt & Whitney 530A engines have that same manufacturing defect?  A You mean encompassing all the engines?  Q Correct. All the Pratt & Whitney 530As that are out there operating.  Do you know of those that are out there operating what percentage of those have bolts installed in the diffuser that do have the manufacturing defect?  A No, I do not.  Q And do you recall a series of questions that Ms. Rathke asked you before regarding why it was, in your understanding, that there were a handful of engines that have been discovered, 530As with broken bolts, but all these other 530As are out there operating. They so far haven't been reported to have broken bolts.  Do you recall that line of questioning?  A Yes, I recall that.  Q And how would this issue of the manufacturing defect on some but perhaps not all bolts, how would it relate to that topic?  A I'm sorry. Could you repeat that question

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		Page 250			Page 252
1	1	Q Sure.	1	1	we have is the 169, and it goes to 687. We
2	2	A I'm sorry. My air-conditioning kicked on and	2	2	don't see any above or below that date. There
3	3	it's hard for me to hear.	3	3	seems to be a range in there. I just don't have
4	4	Q That's okay.	4	4	enough information to draw further correlation
5	5	Does the fact that you don't know what	5	5	with that to real-world failures.
6	6	percentage of those Pratt & Whitney 530A engines	6	6	Q And do you recall Ms. Rathke asked you a number
7	7	that are out there operating have bolts with the	7	7	of questions about whether you asked Pratt &
8	8	manufacturing defect, does that have some	8	8	Whitney for data about certain things?
9	9	relationship to explaining why only a handful of	9	9	A Yes.
10	10	530s have come in with broken bolts?	10	10	Q And are you aware that Pratt & Whitney is no
11	11	MS. RATHKE: Hey, Richard. I'm having	11	11	longer a party defendant in this lawsuit?
12	12	trouble hearing I think it might be Ray's	12	12	A Yeah. I'm aware of that now.
13	13	Internet connection. I don't know if anybody	13	13	Q Right. Are you aware that Ms. Rathke's client,
14	14	else is having trouble hearing him.	14	14	Menard, dismissed them from the lawsuit?
15	15	Richard, can you read back that last	15	15	A No. I am now.
16	16	question.	16	16	Q And are you aware that Ms. Rathke's client,
17	17	(Record read.)	17	17	Menard, dismissed them prior to that provision
18	18	THE DEPONENT: It's entirely possible. I	18	18	manual coming out that we've marked as
19	19	also add that it seems to be a problem limited	19	19	Exhibit 105?
20	20	to the 530 as well that you're not seeing these	20	20	A I am now.
21	21	failures on other bolts. So I suspect it's	21	21	Q Okay. Now, do you recall there were some
22	22	like I said, it's a combination of the bolt and	22	22	questions regarding the West Virginia inspection
23	23	the joint that's contributing to it.	23	23	where Mr. Meyers removed certain bolts from the
24	24	\\\	24	24	subject engines?
25			25		
		Page 251			Page 253
1		BY MR. MARIANI:	1	1	Page 253 A Yes.
1 2	2	BY MR. MARIANI: Q And what's the principle distinction in your	1 2		A Yes. Q Okay. So we've marked as Exhibit No. 106, the
l .		BY MR. MARIANI:  Q And what's the principle distinction in your opinion that's relevant between the 530 versus		2	A Yes.  Q Okay. So we've marked as Exhibit No. 106, the protocol that was provided to us by Mr. Meyers
2	2 3 4	BY MR. MARIANI:  Q And what's the principle distinction in your opinion that's relevant between the 530 versus the other Pratt & Whitney 500 series engine?	2 3 4	2 3 4	A Yes.  Q Okay. So we've marked as Exhibit No. 106, the protocol that was provided to us by Mr. Meyers via Menard. So see if you can open up
2 3 4 5	2 3 4 5	BY MR. MARIANI:  Q And what's the principle distinction in your opinion that's relevant between the 530 versus the other Pratt & Whitney 500 series engine?  A As I previously testified, it's going to be the	2 3 4 5	2 3 4 5	A Yes.  Q Okay. So we've marked as Exhibit No. 106, the protocol that was provided to us by Mr. Meyers via Menard. So see if you can open up Exhibit 106 at this time.
2 3 4 5 6	2 3 4 5 6	BY MR. MARIANI:  Q And what's the principle distinction in your opinion that's relevant between the 530 versus the other Pratt & Whitney 500 series engine?  A As I previously testified, it's going to be the stiffness of the joint as it relates to the	2 3 4 5 6	2 3 4 5 6	A Yes.  Q Okay. So we've marked as Exhibit No. 106, the protocol that was provided to us by Mr. Meyers via Menard. So see if you can open up Exhibit 106 at this time.  (Exhibit No. 106 marked.)
2 3 4 5 6 7	2 3 4 5 6 7	BY MR. MARIANI:  Q And what's the principle distinction in your opinion that's relevant between the 530 versus the other Pratt & Whitney 500 series engine?  A As I previously testified, it's going to be the stiffness of the joint as it relates to the material choice between the 530 and the other	2 3 4 5 6 7	2 3 4 5 6 7	A Yes.  Q Okay. So we've marked as Exhibit No. 106, the protocol that was provided to us by Mr. Meyers via Menard. So see if you can open up Exhibit 106 at this time.  (Exhibit No. 106 marked.)  THE DEPONENT: Okay. I have it open.
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2 3 4 5 6 7 8 9 10 11	2 3 4 5 6 7 8 9 10	BY MR. MARIANI:  Q And what's the principle distinction in your opinion that's relevant between the 530 versus the other Pratt & Whitney 500 series engine?  A As I previously testified, it's going to be the stiffness of the joint as it relates to the material choice between the 530 and the other engines.  Q And "material choice," referring to which engine part?  A The diffuser housing.	2 3 4 5 6 7 8 9 10	2 3 4 5 6 7 8 9 10 11	A Yes.  Q Okay. So we've marked as Exhibit No. 106, the protocol that was provided to us by Mr. Meyers via Menard. So see if you can open up Exhibit 106 at this time.  (Exhibit No. 106 marked.)  THE DEPONENT: Okay. I have it open.  BY MR. MARIANI:  Q Okay. And look that over and tell me what you see on there, if anything, with regard to the breakaway torque being used?
2 3 4 5 6 7 8 9 10 11 12	2 3 4 5 6 7 8 9 10 11 12	BY MR. MARIANI:  Q And what's the principle distinction in your opinion that's relevant between the 530 versus the other Pratt & Whitney 500 series engine?  A As I previously testified, it's going to be the stiffness of the joint as it relates to the material choice between the 530 and the other engines.  Q And "material choice," referring to which engine part?  A The diffuser housing.  MS. RATHKE: You're hard to hear.	2 3 4 5 6 7 8 9 10 11 12	2 3 4 5 6 7 8 9 10 11 12	A Yes.  Q Okay. So we've marked as Exhibit No. 106, the protocol that was provided to us by Mr. Meyers via Menard. So see if you can open up Exhibit 106 at this time.  (Exhibit No. 106 marked.)  THE DEPONENT: Okay. I have it open.  BY MR. MARIANI:  Q Okay. And look that over and tell me what you see on there, if anything, with regard to the breakaway torque being used?  A It says "Characterize bolt torque and/or bolt
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2 3 4 5 6 7 8 9 10 11 12 13 14 15	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	BY MR. MARIANI:  Q And what's the principle distinction in your opinion that's relevant between the 530 versus the other Pratt & Whitney 500 series engine?  A As I previously testified, it's going to be the stiffness of the joint as it relates to the material choice between the 530 and the other engines.  Q And "material choice," referring to which engine part?  A The diffuser housing.  MS. RATHKE: You're hard to hear.  MR. MARIANI: I'm speaking as loudly as I can, so I am doing my best.  BY MR. MARIANI:  Q So when you say "material choice," referring to	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	A Yes.  Q Okay. So we've marked as Exhibit No. 106, the protocol that was provided to us by Mr. Meyers via Menard. So see if you can open up Exhibit 106 at this time.  (Exhibit No. 106 marked.)  THE DEPONENT: Okay. I have it open.  BY MR. MARIANI:  Q Okay. And look that over and tell me what you see on there, if anything, with regard to the breakaway torque being used?  A It says "Characterize bolt torque and/or bolt stretch to subject bolt installed on the engine."  Q All right. Do you recall Ms. Rathke asked you questions? She didn't show you this document
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2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	BY MR. MARIANI:  Q And what's the principle distinction in your opinion that's relevant between the 530 versus the other Pratt & Whitney 500 series engine?  A As I previously testified, it's going to be the stiffness of the joint as it relates to the material choice between the 530 and the other engines.  Q And "material choice," referring to which engine part?  A The diffuser housing.  MS. RATHKE: You're hard to hear.  MR. MARIANI: I'm speaking as loudly as I can, so I am doing my best.  BY MR. MARIANI:  Q So when you say "material choice," referring to which engine part?  A The diffuser housing. The diffuser housing on the PW530A is titanium alloy and the remainder appear to be a steel alloy.  Q Did you find anything noteworthy with regard to the serial numbers on the Pratt engines that have experienced the bolt failure?	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	A Yes.  Q Okay. So we've marked as Exhibit No. 106, the protocol that was provided to us by Mr. Meyers via Menard. So see if you can open up Exhibit 106 at this time.  (Exhibit No. 106 marked.)  THE DEPONENT: Okay. I have it open.  BY MR. MARIANI:  Q Okay. And look that over and tell me what you see on there, if anything, with regard to the breakaway torque being used?  A It says "Characterize bolt torque and/or bolt stretch to subject bolt installed on the engine."  Q All right. Do you recall Ms. Rathke asked you questions? She didn't show you this document before, do you remember, but she asked you questions about it where she was saying to you isn't it true that this document was approved by all the parties before the inspection?  Do you recall that?  MS. RATHKE: Object to foundation.  THE DEPONENT: Yes.
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	Page 254			Page 256
1 1	BY MR. MARIANI:	1	1	direction, measure breakaway torque in the
2 2	Q And now that you see the document that you	2	2	loosening direction, or something like that.
3 3	weren't shown before when she questioned you,	3	3	That's fairly common on bolt inspection
4 4	now you can see in the document there's	4	4	protocols that I've seen and written.
5 5	absolutely no mention about Mr. Meyers doing	5	5	BY MR. MARIANI:
6 6	anything with regard to how he was going to	6	6	Q Do you see anything like that in this protocol
7 7	measure breakaway torque, what instrument he was	7	7	that Mr. Meyers sent us via Menard's lawyers?
8 8	going to use, whether he was going to put the	8	8	A No. No. In fact, I probably object to
9 9	bolts back in and take them out again.		9	measuring bolt stretch because it's irrelevant,
10 10	_	10		as discussed in my report.
11 11	getting to see the document?	11	11	
	A It's pretty vague. It just says characterize	12	12	I'm going to pull up another exhibit. Give
13 13		13	13	me one second.
14 14		14	14	Do you recall Ms. Rathke asked you some
15 15	•	15	15	questions before about an NTSB report that
16 16		16	16	Mr. Meyers was relying on?
17 17				A Yes.
18 18		18	18	Q Okay. And that's Exhibit 99, which I'm now
19 19		19		opening again. And can you open Exhibit 99 as
20 20		20	20	well?
21 21		21	21	A Yes. Give me one moment, please.
22 22		22	22	Yes, I have Exhibit 99 open.
23 23		23	23	Q Okay. And do you recall when Ms. Rathke
24 24	characterization that they want to perform	24	24	questioned you, do you recall her reading the
25		25		
	Page 255			Page 257
	_			1 age 237
1 1	wanted to perform.	1	1	analysis but stopping at the end of the sentence
1 1 2 2	wanted to perform.  Q If you were going to draft a protocol and wanted		1 2	analysis but stopping at the end of the sentence that said the sentence that reads, quote,
	wanted to perform.  Q If you were going to draft a protocol and wanted to actually tell somebody what you were doing,	2 3	2	analysis but stopping at the end of the sentence that said the sentence that reads, quote, "One not on the No. 4 connecting rod it also
2 2 3 3 4 4	wanted to perform.  Q If you were going to draft a protocol and wanted to actually tell somebody what you were doing, not hidden from them but disclose it in advance	2 3 4	2 3 4	analysis but stopping at the end of the sentence that said the sentence that reads, quote, "One not on the No. 4 connecting rod it also backed off but had not failed," closed quote.
2 2 3 3 4 4 5 5	wanted to perform.  Q If you were going to draft a protocol and wanted to actually tell somebody what you were doing, not hidden from them but disclose it in advance how you were going to do breakaway torque, would	2 3 4 5	2 3 4 5	analysis but stopping at the end of the sentence that said the sentence that reads, quote, "One not on the No. 4 connecting rod it also backed off but had not failed," closed quote.  Do you recall that and then she jumped to
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Page 2.	Page 260
1 1 conclusion can be drawn from the adequacy of the	1 1 page, and she pointed you to Figure 26 and said
2 2 original installation torque? What does that	2 2 to you "Why do you have Bolt No. 3 there when
3 3 mean to you?	3 3 you were talking of Bolt No. 15?"
4 4 A It means to me based on my reading of this,	4 4 Do you recall that discussion?
5 5 they're not putting a lot of stock in their	5 5 A Yes.
6 6 test.	6 6 Q Now, take a look at the top of page 37. Do you
7 7 Q Okay. And when we went to page 4 earlier,	7 7 discuss Bolt No. 3 on page 37?
8 8 Ms. Rathke was questioning you on page 4, and	8 8 A Yes, I do. I discuss it on page 37.
9 9 she asked you if the NTSB in this instance was	9 9 Q Please read into the record what you stated
10 10 trying to measure the torque that had been	10 10 there.
11 11 applied.	11 11 A "While inspecting the bolts while inspecting
12 12 Do you recall that?	12 12 the bolts that had been removed from the subject
13 13 A Yes.	13 13 engines, Fusion Engineering noted significant
14 14 Q If you're trying to measure torque that's	14 14 changes to the nature of the Never-Seez
15 15 supposed to be set to 480 inch-pounds, can you	15 15 remaining on the bolts. The Never-Seez on the
16 16 possibly do that under the rules of physics with	16 16 removal of bolts appeared dried and cracked as
17 17 a wrench that only goes to 300 inch-pounds?	17 17 shown on Bolt 3 from DAO687 in Figure 26.
18 18 A Well, you can certainly break it away but you	18 18 Contrastingly, fresh Never-Seez has an oily, wet
19 19 would not receive a measurement.	19 19 appearance and tends to flow to some degree when
20 20 Q You would never know if it went to over 400 if	20 20 applied to the bolt as shown in Figure 27.
21 21 the wrench you're holding only goes up to 300;	21 21 "NASA publication 1228, referenced several
22 22 is that true?	22 22 times by Mr. Meyers, indicates that Never-Seez
23 23 MS. RATHKE: Object to the form.	23 23 is satisfactory as a one-time lubricant. It
24 24 THE DEPONENT: That's correct.	24 24 also indicates that oil within Never-Seez boils
25	25
Page 2:	59 Page 261
1 1 BY MR. MARIANI:	1 1 off during temperature exposure but the compound
2 2 Q Okay. Let's take a look at your report, if we	2 2 leaves non-galling oxides of nickel, copper, and
3 3 could, which has been previously marked as	3 3 zinc between the threads."
4 4 Exhibit No	4 4 Q Thank you.
5 5 A Okay. I have it open.	5 5 And so was your reference of your insertion
6 6 Q Sorry. I just need to get the number.	6 6 of Bolt No. 3 on that page by accident or was
7 7 Okay. Exhibit 91.	7 7 that intentional by you?
8 8 So if you can go to page 36 as numbered at	8 8 A No. As I stated before, it was intentional
9 9 the bottom, Bates number 5540, and tell me when	9 9 because it was a good image that showed exactly
10 10 you reach that.	10 10 what I was speaking to. On Bolt No. 15 that
11 11 A I'm sorry. I heard you say turn to page 36 and	11 11 Mr. Meyers tested had been dipped in or
12 12 then I lost you there.	12 12 coated with turbine oil. So it did not have the
13 13 Q I'm just giving the corresponding Bates number,	13 13 same appearance as the remainder of the bolts
14 14 5540.	14 14 that were removed from the engine.
15 15 A Okay.	15 15 Q Okay. Do you have an understanding with regard
16 16 Q Are you at that page?	16 16 to well, let me withdraw that.
17 17 A I'm on page 36 of my report.	17 17 Do you recall you had a discussion with
18 18 Q Okay. And do you recall Ms. Rathke asked you	18 18 Ms. Rathke earlier with regard to the process of
19 19 questions about your discussion at the bottom of	19 19 mechanics in different maintenance shops, such
20 20 page 36 where you had commented about the Bolt	20 20 as Dallas Airmotive or Pratt & Whitney of West
21 21 No. 15 which showed residual Never-Seez.	21 21 Virginia, performing the installation of the
22 22 Do you recall that?	22 22 diffuser with the diffuser bolts and there being
23 23 A Yes.	23 23 potentially slight variations with regard to
24.24.0.4.441	
24 24 Q And then do you recall she went to the next	24 24 their installation process when they're doing
24 24 Q And then do you recall she went to the next 25	24 24 their installation process when they're doing 25

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Page 262	Page 264
1 1 that.	1 1 else?
2 2 Do you recall this discussion?	2 2 MS. SUSZYNSKI: I don't. Thank you.
3 3 A Yes.	3 3 MR. MARIANI: Okay. Then the deposition is
4 4 Q Is it your understanding when the torque is	4 4 concluded.
5 5 applied to the bolts, is there only one number	5 5 Thank you very much, Rich, our reporter,
6 6 specified by the Pratt & Whitney manual for the	6 6 for your cooperation today.
7 7 torque value or is it a range of torque that can	7 7 (Signature reserved.)
8 8 be applied?	8 8 (Deposition concluded.)
9 9 A It's a range of torque.	9 9
10 10 Q So is it your understanding that when the	10 10
11 11 mechanics are doing this in two different shops,	11 11
12 12 that they could be applying different torque	12 12
13 13 when they put the bolts on, but both shops in	13 13
14 14 both mechanics are doing the job according to	14 14
15 15 the manual?	15 15
16 16 A That's possible. And there's also a	16 16
17 17 contribution to air from the torque wrench, even	17 17
18 18 though it's calibrated because the torque wrench	18 18
19 19 also has an air associated with it.	19 19
20 20 Q And did you reach a conclusion in your work that	20 20
21 21 with regard to these potentially slow variations	21 21
22 22 in the install process could potentially have	22 22
23 23 some effect with regard to the life of these	23 23
24 24 bolts?	24 24
25	25
Page 263	Page 265
1 1 A Well, absolutely, because as I think I	1 1 CERTIFICATE
2 2 testified earlier is the preload on these bolts	2
3 3 at room temperature is very, very low. It's	2 3 I, Richard D. Ehrlich, a Certified Shorthand
4 4 well less than half of the yield strength of the	3 4 Reporter of the State of Illinois, CSR License No.
5 5 bolt, which is, from an engineering perspective,	4 5 084-2019, do hereby certify that I stenographically
6 6 a very low preload for a fatigue perspective.	5 6 reported the proceedings had at the Zoom deposition,
7 7 So if you have something that's torqued or	6 7 as aforesaid, and that the foregoing transcript is a
8 8 preloaded to a very low preload to begin with	7 8 true and accurate record of the proceedings had 8 9 therein.
9 9 and now you start getting small variations,	8 9 therein. 9 10 IN WITNESS WHEREOF, I do set my hand at
10 10 you're going to increase your likelihood of	10 11 Chicago, Illinois, this 29th day of June, 2020.
11 11 fatigue because the scatter in the preload will	11 12 /// and f
12 12 be higher.	12 91 9 9 S
13 13 MR. MARIANI: Okay. I don't have any	13 13 Richard D. Ehrlich
14 14 further questions at this time.	14 Certified Shorthand Reporter
Does anybody else have questions for the	15 14 License No. 084.2019
16 16 witness?	16 15
17 17 MS. RATHKE: I have one follow-up question.	17 16
18 18 EXAMINATION 19 19 BY MS. RATHKE:	18 17
<ul><li>19 19 BY MS. RATHKE:</li><li>20 20 Q Mr. Jones, you referenced a racing background.</li></ul>	19 18
20 20 Q Mr. Jones, you referenced a racing background. 21 21 Is that Go-Karts?	20 19
22 22 A I've raced Go-Karts, midgets, cars, sprint cars.	21 20
23 23 MS. RATHKE: Okay. No further questions.	22 21 23 22
24 24 MR. MARIANI: Casey, do you have anything	23 22 24 23
	1.2.4.2.2
25 With With the Casey, do you have anything	25 24

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	Page 266				Page 268
1	Veritext Legal Solutions	1	1	DEPOSITION REVIEW	
	1100 Superior Ave	2	2	CERTIFICATION OF WITNESS	
2	Suite 1820			ASSIGNMENT REFERENCE NO: 4122884	
	Cleveland, Ohio 44114	3	3	CASE NAME: Menard, Inc. v. Textron Aviation, Inc., et al. DATE OF DEPOSITION: 6/12/2020	
2	· · · · · · · · · · · · · · · · · · ·	4	4	WITNESS' NAME: Aaron Jones	
3	Phone: 216-523-1313		5	In accordance with the Rules of Civil	
	June 29, 2020	5	6	Procedure, I have read the entire transcript of my testimony or it has been read to me.	
5	To: Raymond L. Mariani	6	7	I have listed my changes on the attached	
6	Case Name: Menard, Inc. v. Textron Aviation, Inc., et al.		_	Errata Sheet, listing page and line numbers as	
7	Veritext Reference Number: 4122884	7	8	well as the reason(s) for the change(s).  I request that these changes be entered	
8	Witness: Aaron Jones Deposition Date: 6/12/2020	8	_	as part of the record of my testimony.	
9	Dear Sir/Madam:		10	The second second	
	Enclosed please find a deposition transcript. Please have the	9	11	I have executed the Errata Sheet, as well as this Certificate, and request and authorize	
	witness	10		that both be appended to the transcript of my	
		11	12	testimony and be incorporated therein.	
	review the transcript and note any changes or corrections on the	11	13	Date Aaron Jones	
13	included errata sheet, indicating the page, line number, change,	12	14		
14	and	12	15	Sworn to and subscribed before me, a Notary Public in and for the State and County,	
15	the reason for the change. Have the witness' signature notarized	13	13	the referenced witness did personally appear	
16	and	14	16	and acknowledge that:	
17	forward the completed page(s) back to us at the Production	15	17	They have read the transcript; They have listed all of their corrections	
	address shown	13	18	in the appended Errata Sheet;	
	above, or email to production-midwest@veritext.com.	16		They signed the foregoing Sworn	
	•	17	19	Statement; and Their execution of this Statement is of	
	If the errata is not returned within thirty days of your receipt	18	20	their free act and deed.	
21		19		I have affixed my name and official seal	
22	this letter, the reading and signing will be deemed waived.	20		this day of, 20	
23	Sincerely,	22		Notary Public	
24	Production Department	23 24	24		
	NO NOTARY REQUIRED IN CA	25	25	Commission Expiration Date	
	NO NOTARY REQUIRED IN CA		25	Commission Expiration Date	
25	Page 267	25		Commission Expiration Date	Page 269
	Page 267 1 DEPOSITION REVIEW	25	25	Commission Expiration Date  ERRATA SHEET	Page 269
25	Page 267  DEPOSITION REVIEW CERTIFICATION OF WITNESS  2	25		·	Page 269
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Wisconsin Rules of Civil Procedure

Chapter 804, Depositions and Discovery

Section 804.05

(6) Submission to Deponent; Changes; Signing. If requested by the deponent or any party, when the testimony is fully transcribed the deposition shall be submitted to the deponent for examination and shall be read to or by the deponent. Any changes in form or substance which the deponent desires to make shall be entered upon the deposition by the officer with a statement of the reasons given by the deponent for making them. The deposition shall then be signed by the deponent, unless the parties by stipulation waive the signing or the witness is ill or cannot be found or refuses to sign. If the deposition is not signed by the deponent within 30 days after its submission to the deponent, the officer shall sign it and state on the record the fact of the waiver or of the illness or absence of the deponent or the fact of the refusal or failure to sign together with the reason, if any, given therefor; and the deposition may then be used as fully as though signed unless on a motion to suppress under s. 804.07 (3) (d) the court holds

that the reasons given for the refusal or failure to sign require rejection of the deposition in whole or in part.

DISCLAIMER: THE FOREGOING CIVIL PROCEDURE RULES

ARE PROVIDED FORINFORMATIONAL PURPOSES ONLY.

THE ABOVE RULES ARE CURRENT AS OF APRIL1,

2019. PLEASE REFER TO THE APPLICABLE STATE RULES

OF CIVIL PROCEDURE FOR UP-TO-DATE INFORMATION.

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Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

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